AVIATION WEEK

APR. 16, 1951

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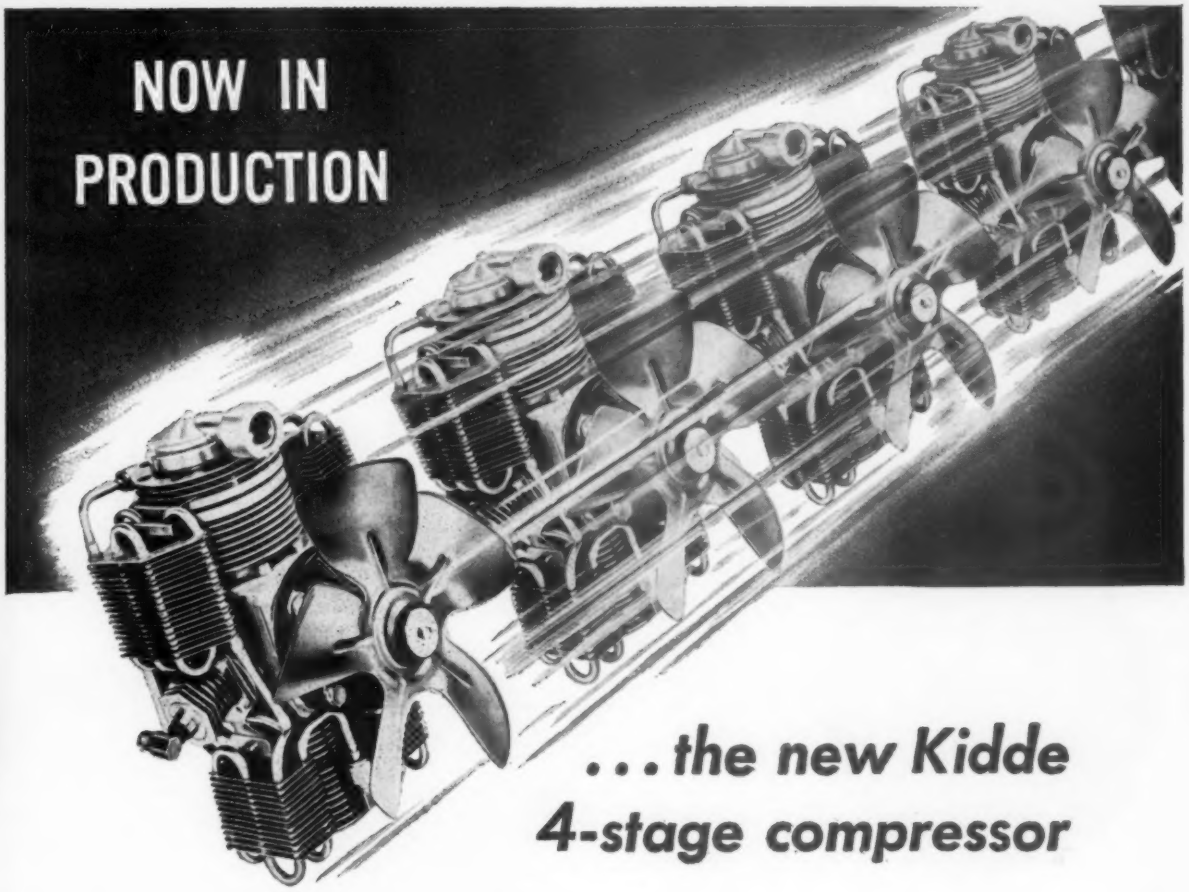
A-9



. . . the new Kidde 4-stage compressor

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A lightweight compressor is now in production that makes pneumatic power practical in aircraft. This new Kidde compressor at 35,000 feet will, from ambient pressure, deliver *one* cfm of free air compressed to 3,000 psi. At sea level it will deliver *four* cfm of free air compressed to 3,000 psi. The sea level performance can be maintained at altitude when inlet air is pressurized.

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You name the Engine

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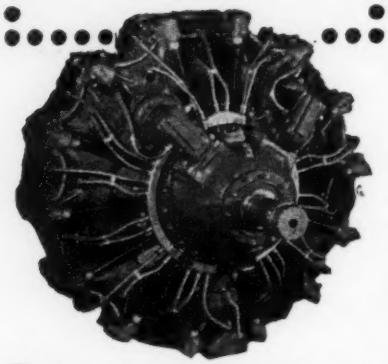

During the war, TITEFLEX made ignition shielding for practically every type of reciprocating engine used on military and civilian aircraft. Today there is scarcely an airline in the United States and Canada that does not use TITEFLEX ignition shielding on at least a part of their equipment.

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Aviation Week

ABP Member ABC

Volume 54 April 16, 1951 Number 16

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Airplane vs. Auto. In 1914, Lincoln Beachey raced his pusher neck and neckagainst speed demon Barney Oldfield at county fairs, expositions and other get-togethers all over the country. A mile a minute was a terrific speed—on the ground or in the air.

FROM 60 MPH TO 600 MPH!

600 MPH . . . AND MORE! The Northrop X-4 is one of the smallest airplanes ever built for the Air Force, with a wing spread of only 25 feet. This jet-powered, flying-wing type, research plane is shown here streaking across the California desert on a test flight at *ten* miles a minute.

The story of aviation is a story of remarkable engineering progress . . . *plus* great advances in the technology of petroleum. Improvement in aviation fuel is *one* of the reasons why today's planes can breeze along easily at speeds which would have seemed incredible forty years ago!

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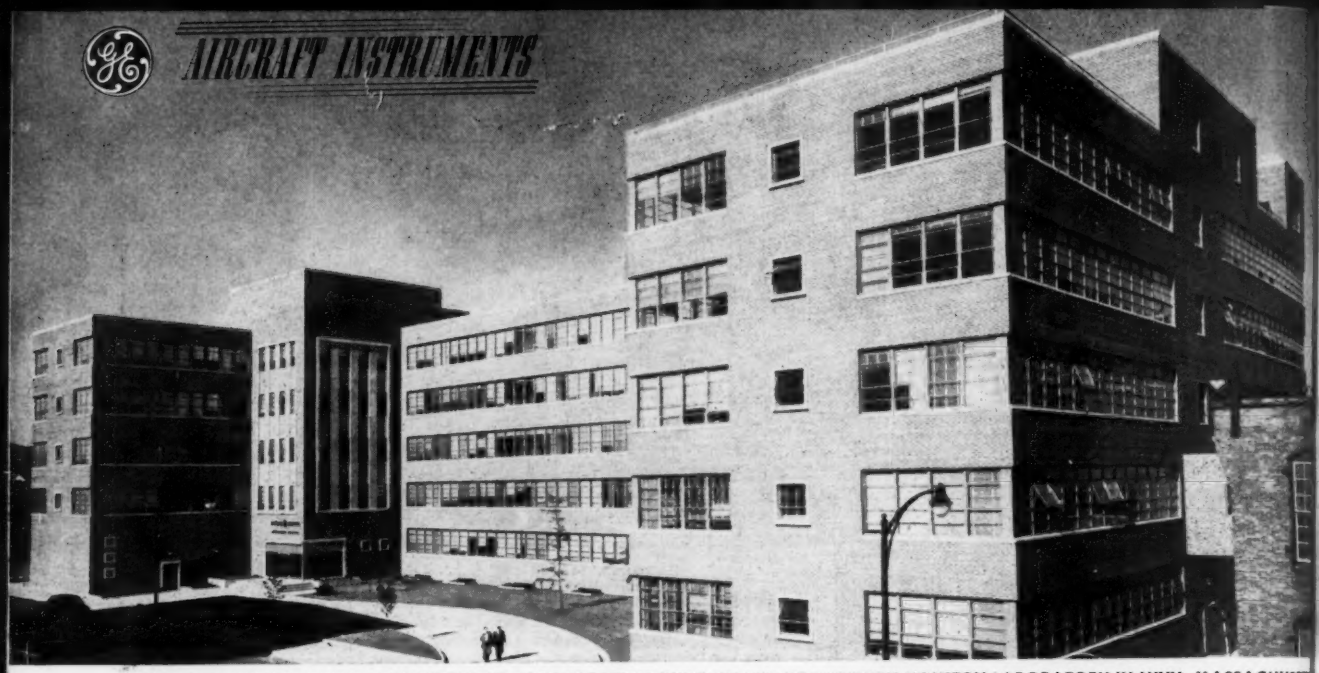
For dependable, high-performance aviation products, call on Phillips. The Aviation Department, Phillips Petroleum Company, Bartlesville, Oklahoma.

Phillips 66

AVIATION PRODUCTS

AIRCRAFT INSTRUMENTS



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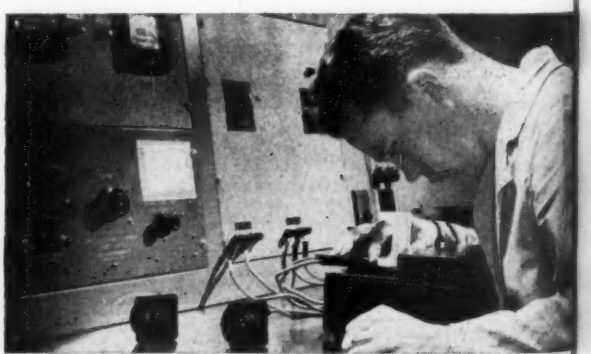
Out of the research, analysis, and tests conducted here, depe able G-E aircraft instruments are developed. For more informati about how the new Measurements Laboratory helps assure pendable instruments, contact your G-E aviation specialist write Section 607-21, General Electric, Schenectady 5, N.

EXTREME TEMPERATURE and humidity conditions are duplicated in these lab chambers where G-E aircraft instruments are tested.



PRODUCTION INSTRUMENT, selected at random, is compared with a Me urements Laboratory standard for quality-control and accuracy che

Sixty-seven years of instrument experience—

GENERAL ELECTRIC

607-21

NEWS DIGEST

DOMESTIC

Lockheed has reached agreement with IAM Aeronautical Lodge 1996 covering wages and conditions at the company's bomber plant at Marietta, Ga., currently modifying B-29s. Employe privileges, pay provisions and rates are to be negotiated locally. Labor grades for higher skills in factory and technical office classifications at Marietta carry the same minimum and maximum wage rates as at Burbank. Wage rates are still to be approved by USAF and Wage Stabilization Board.

New world speed record of 469 mph. for propeller-drive planes was set Apr. 9 by Jacqueline Cochran flying a North American F-51 over a 16-mi. straight-away course at Indio, Calif. Miss Cochran now holds five of the seven recognized world's speed records for different distances in the open class for piston-powered planes.

Air express shipments handled by scheduled U. S. airlines in February totaled 455,315, an increase of 57 percent over a year ago, with revenues being more than $2.7 million, an 88 percent increase over 1949. Pounds carried exceeded 13 million, a 131.2 percent increase.

TWA has sold its five Boeing Stratoliners to a French nonsked airline operating in Africa, Aigle d'Azure (Blue Eagle). The deal was handled through ECA. TWA is overhauling the planes prior to delivery. Price for the fleet was $550,000.

Southwest Airways DC-3 crash in California took lives of all 22 persons aboard when the local service airliner flew into the side of a mountain.

FINANCIAL

Slick Airways reports the first profitable first quarter in its history—estimated at $287,000, before taxes, resulting from carrying 16.3 million ton miles—a 123-percent increase in traffic over 1950's corresponding period. March ton-mileage was 5,664,093.

Electric Boat Co. and its aircraft subsidiary, Canadair Ltd., sales during 1950 declined to $41,754,339 from 1949's $45,234,961. Backlog at the end of 1950 was $91,260,000, almost double the $45,780,000 backlog at the close of the preceding year.

Standard-Thomson Corp. reports a net profit of $585,811 after taxes for the nine months ended Feb. 28, compared with a profit of $396,955 in the similar period of the previous fiscal year. Net sales for the latest nine months were $7,833,080, a 54-percent gain over the like period a year ago.

Our Expanding Industry . . .

Oldsmobile division of GM will soon begin construction of a building providing 700,000 sq. ft. of space near its Lansing, Mich., forging operation to handle compressor and turbine subcontracts for the Buick-built Wright J-65 Sapphire. . . . Beech Aircraft Corp. has received a "substantial order" from the Royal Canadian Air Force for Beech 18 twin-engine trainers and communications planes. . . . Kaman Aircraft Corp. is doubling its production facilities and personnel to handle its $18-million backlog. Employment on Feb. 1 had risen to 500. . . . Westinghouse Electric Corp. has received an $8.5-million Navy contract for radar equipment which it will build at its Springfield, Mass. plant, used to handle military radio work in World War II. The Westinghouse Television & Radio division, Sunbury, Conn. has received four contracts totaling about $12 million for military radio test equipment, transmitters and other electronic gear.

INTERNATIONAL

Canadian Pacific Air Lines made a net profit in 1950 of $203,000 compared with a net loss of $113,000 in 1949. Gross revenues in Canadian domestic operations increased 9.9 percent.

English Electric Canberra has been developed into a photo-reconnaissance version, the P. R. Mk. 3.

British European Airways experienced a deficit of $880,353.60, during January, its most disappointing month since Nov., 1948. Even though the carrier earned more than in January 1950, it cost it 14 percent more to earn it.

CP Hot Dimpler 450-EA

for hot dimpling—

of magnesium and the harder aluminum alloys

In dimpling magnesium and the harder aluminum alloys, the application of heat is recommended to eliminate cracked dimples.

Developed for this type of work, the CP Hot Dimpler incorporates Zephyr coin edge dimpling punches and dies which insure accurate nesting of dimples. Write for detailed information on the new CP-450-EA hot dimpler.

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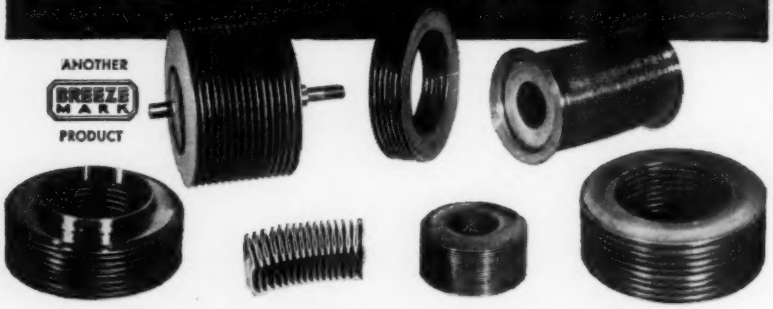
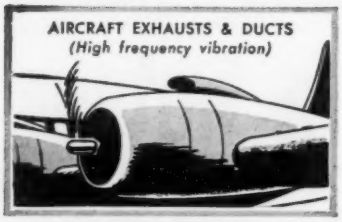
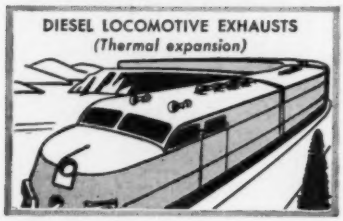
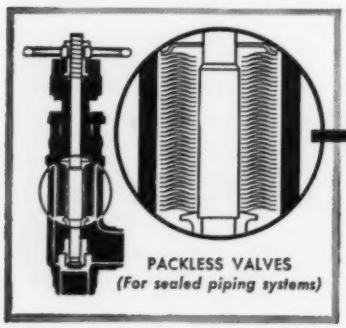


...Give LASTING PROTECTION Where Ordinary Bellows Fail







Breeze welded diaphragm bellows meet the operating life cycle of any equipment in which they are used *because every Breeze bellows design is individually engineered and built for the job.*

Breeze has no "stock bellows," but if you have a vibration problem in ducts, large or small, or want permanently sealed valve enclosures in any type of piping system, or need bellows for torque transmission or other uses, Breeze experience can quickly provide the answer . . . and production can meet your requirements.

A Breeze bellows is dependable because each diaphragm is designed to work well within its elastic limit. This is accomplished by thorough analysis of each application and careful design of the bellows to withstand all requirements. "Job engineering" each individual type eliminates makeshifts, assures efficient performance.

Breeze bellows are made in stainless steel, inconel, monel, nickel, steel, or other weldable alloys.

Feel free to consult us without obligation on your existing bellows requirements, or any other project where reliable welded diaphragm type bellows might solve a design problem.

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SIDELIGHTS

Air Force

Aircraft Production Resources Agency, joint Air Force-Navy materials scheduling unit, is coordinating its program with Air Force buyers, and recently held a conference with them to explain how its scheduling operations could be of use to them and their contractors . . . Newest Dayton telephone directory lists **resident representatives** of 32 aircraft, engine and equipment companies . . . A Boeing C-97 **Stratofreighter** has chalked up 244 flight hours during its first 27 days' service at Kelly AFB, Tex., an average of 9-plus hours per day . . . Commanding general of **Turkish Air Force,** Lt. Gen. Muzaffer Goksenin, is in the U. S. as guest of the USAF for a tour of the aircraft industry and to speed up MDAP deliveries to Turkey . . . Commanding general of the newly activated **18th Troop Carrier AF** is Maj. Gen. Robert W. Douglass, Jr.; he has been special assistant to USAF's commanding general in Europe . . . **Air Training Command** announces selection of Northrop Aeronautical Institute, Hawthorne, Cal., as a training center for AF airframe repairmen, but school's civilian courses will not be affected.

Navy

Rear Admiral Ralph Arnold is named **Aviation Supply Officer** Aviation Supply Office, Philadelphia; he will also serve as commanding officer of the Naval Aviation Supply Depot for the 4th Naval District . . . **Capt. Walter Diehl** USN, pioneer in aerodynamic and aircraft design, retired Mar. 31 . . . **Marine Corps** has been delivering front line mail to troops in Korea with colored parachutes.

Army

The famous **508th Airborne Infantry Regiment** is being re-activated at Ft. Bragg, N. C. It will be a separate regiment assigned to 3rd Army HQ. It will be expanded to regimental combat team strength; Col. Joseph Cleland is commanding . . .

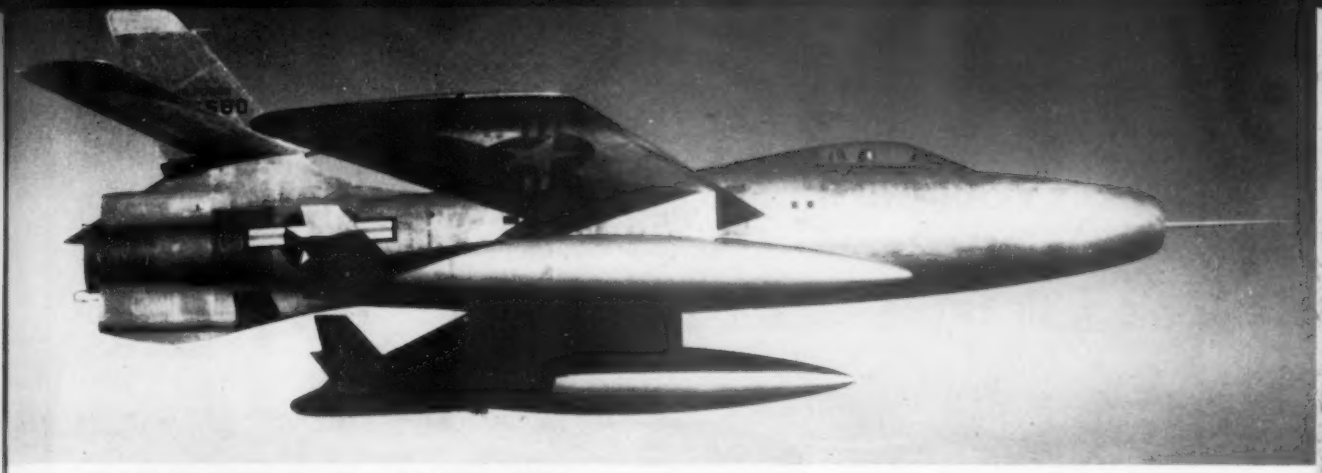
Air National Guard

Ten **tow target flights** have been ordered into service by May 15, involving 650 officers and men from units in 10 states. They will fly B-26s.

CAB

House Appropriations Committee approved $25,000 more for CAB's study of **separating subsidy** from air mail pay. Board expects to have a formula for separation by mid-year and will apply it to the 16 domestic trunklines during the last half of 1951 . . . First victim of CAB's new **code of ethics** forbidding "influence" peddling was California-Eastern Airways' plan for a Washington-West Coast press trip so reporters could visit hearings on Cal-Eastern's (and

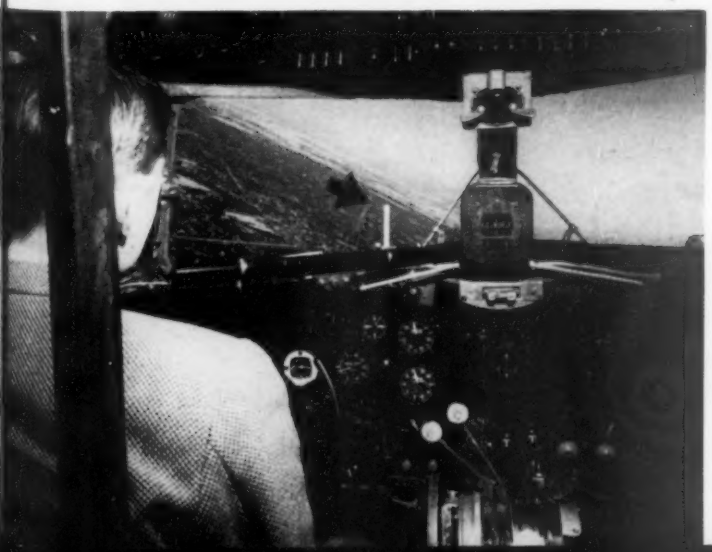
(*Continued on page 18*)



WELL-TANKED—Republic XF-91 high-altitude USAF interceptor has been fitted with these sleek company-designed-and-built multi-finned auxiliary fuel tanks of 500-gal. capacity each to boost the 800-mph.-plus fighter's duration. Pylons, tanks can be jettisoned.

NEW CAREER IN KOREA—Sikorsky H-19 copter undergoes ten-place trials for evacuation of combat wounded.

LANDING A CUTLASS—Vought F7U-1 Cutlass twin-jet carrier fighter comes in with hook down during deck landing tests.



Military Aviation Picture Highlights

AUTOPILOT HAS STEADY NERVES—New improved autopilot developed by Minneapolis-Honeywell and the Navy shows its acute sensitivity as cigarette (arrow) remains upright during a 30-deg. bank. Note the slanted horizon through the test plane's windshield.

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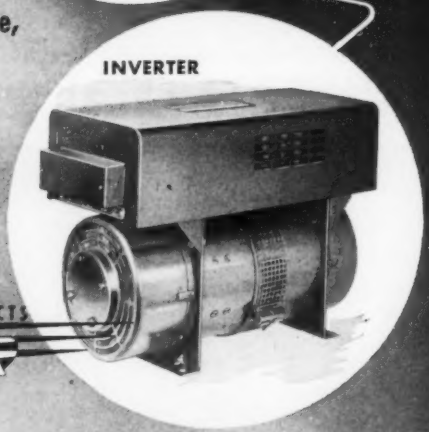
. . . no matter what the requirements of modern aviation are, EICOR products stand for the best in sensitively controlled current under any and all flying conditions.



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WHO'S WHERE

In the Front Office

W. L. Landers has been named vice president of Fairchild Engine & Airplane Corp. and general manager of the Airplane division. With Fairchild since 1945, when he joined the Aircraft division as head of the production department, Landers has spent 17 yr. in the industry and is known as a top production and manufacturing executive.

A. S. Blumenthal has been appointed vice president-manufacturing of the Aircraft division of Majestic Metal Specialties Corp., Moosup, Conn., and **Morton L. Frank** has been made vice president and comptroller of the division. Blumenthal has over 25 yr. of production experience, including posts with Fairchild and Bellanca; Frank prior to his new appointment was treasurer and assistant general manager of Bellanca.

Gordon Murphy has been promoted to vice president-manufacturing of the Precision Gear division of Foote Bros. Gear & Machine Corp., Chicago. His previous position was as manager of manufacturing for the division. He joined the firm in 1947.

Changes

William H. Gunderson has been named plant manager of Bell Aircraft's operations in the former Globe Aircraft facility at Ft. Worth, Tex., which will work on jet engine nacelles. **James P. McNamara** has been appointed manager of industrial relations of Bell Aircraft. . . . **Lt. Col. S. E. Cleveland** has been made field project officer in charge of the Fairchild-Kaiser C-119 project. . . . **Lester M. Hitchcock** is the new staff engineer in charge of structures for Boeing Airplane's engineering division, replacing **George Snyder,** recently put in charge of a classified project.

Dudley H. Digges, with RFC for 17 yr., has been named assistant manager of contracts for Convair's San Diego division. . . . **Andrew Kalitinsky,** formerly chief engineer of the NEPA project, has been appointed manager of M. W. Kellog Co.'s Special Projects department, which is handling rocket motor research. . . . **Kenneth E. Fersch** has been made Dayton, Ohio, representative of Curtiss-Wright's Propeller division, succeeding **A. L. Ervin, Jr.,** who has been promoted to coordinator of military programs.

W. N. Stone has been appointed assistant chief engineer at Kaman Aircraft and **R. D. Moses** has been named senior engineer in charge of Kaman's new engineering offices at 128 Allyn St., Hartford, Conn. . . . **G. K. Peets** has been promoted to factory manager in charge of all aircraft jet engine production of Packard Motor Car Co. . . . **Robert B. Kinkead,** industrial aircraft specialist with the Defense Supply Board of NATO, has joined Republic Aviation Corp. as director of the European division. **Leverett (Pete) Wenk** has been named director of training for Republic.

INDUSTRY OBSERVER

►Air Force is getting ready to install new scientific weighing equipment for thrust measurements on new jet aircraft at Edwards AFB, Muroc, Calif., after industry weight specialists provide opinions on requirements. Up until now the Muroc testing center has had to rely almost entirely on thrust measuring equipment provided by the various manufacturers.

►The Canadian government plans to build a two-place jet training plane of American design and equipped with a low power centrifugal-type jet engine, according to Air Vice Marshall Frank McGill, in charge of Canada's aircraft production. The jet trainer will be used to bridge pilot training from Canadian-made North American Harvard (T-6) training planes to the Canadian-produced CF-100 and F-86E jet fighters.

►Aircraft manufacturers are asking CAB to defer the standardization program for flight instrument panel layout, panel lighting and cockpits of conventional transport airplanes, on the ground that turbojet and turboprop transports will need standardization along with the conventional craft but won't be ready until they have had more service experience.

►While North American has completed successful rocket firing tests with 24 Mighty Mouse 2.75 in. solid propellant rockets carried by the F-86D all-weather jet interceptor, unification hasn't yet reached the point where the Air Force will specify the Navy-developed projectile for the all-weather fighter. However, the test results will come in handy for the FJ-2 Navy all-weather jet interceptor, which will be very similar to the F-86D.

►Sikorsky Aircraft expects that the first S-55 helicopter to be delivered outside the U. S. military services will go to Westland Aircraft Ltd., British licensee-manufacturer, which is already preparing to make the big 10-place copter.

►Contracts received by Alvis Ltd. for a substantial quantity of the 550-hp. Leonides engine, for the new RAF Percival P.56 Mk.2 basic trainer establishes the Leonides as probably the most important piston engine in the future British production picture. Every postwar aircraft in Britain using an engine in this power class has now been powered with one of the Leonides six models. Principal previous installations are in the Westland-Sikorsky S-51 Dragonfly helicopter, twin-engine Percival Prince, and single-engine and twin-engine Bristol helicopters.

►Convair engineers will add a plenum chamber to the air inlet duct system of each Allison T-40 turboprop engine on the Convair XP5Y-1 flying boat to prevent flame quenching encountered during landings using reverse propeller pitch. Under these conditions, the prop blade tips have been throwing quantities of water upwards and forwards, which then came back into the inlet ducts.

►First deliveries in Beech's quantity order of D18S twin-engine navigation trainers for the Royal Canadian Air Force are scheduled to begin in May. This gives a new lease on life to the 18s which had been scheduled to be phased out in favor of the smaller Beech Twin Bonanzas, as commercial and executive planes. Beech sold over 7000 military versions of the Model 18 in World War II, afterwards produced a substantial number for executive transports.

►New high-altitude ejection bailout techniques for USAF jet pilots, developed in recent tests at Holloman AFB, provide for the pilot to separate from his seat as soon as the ejection procedure is completed, instead of riding down with it, as formerly. Emergency oxygen supply will be attached to the pilots' flying suit, instead of to the seat. He will "free fall" to a pre-determined altitude at which a preset automatic device is designed to open his chute. Change in procedure followed tests indicating that high rates of rotation and severe buffeting was experienced in the long delayed drops with the seats, with severe discomfort to the jumpers.

Washington Roundup

Little and Late

Washington talks urgency and emergency. But the push behind military mobilization that was at high tide in December after the Chinese Communist onslaught in Korea seems to ebb with time.

The President finally submitted a recommendation to Congress for an additional $6 billion for the armed services for this fiscal year. It was three months late and $14 billion below the Joint Chiefs of Staff's estimated requirement.

The JCS program for partial mobilization would have required $20 billion in January to reach an effective nucleus of fighting strength in being by mid-1952.

In December, senators on the Appropriations Committee berated the military command for being "partial", instead of "all-out", on defense mobilization. Now they seem unconcerned that the time-table for even "partial" mobilization isn't being met.

The Administration isn't cutting back on the JCS program; it's just extending it over a longer period of time. This course is a triumph for politics over preparedness and economy. By stretching it out, the program will:

• **Moneywise,** require less this year and next year, easing the pressure for unpopular tax hikes. Over-all, it will cost more. "Spacing out" adds overhead cost.

• **Defense-wise,** put off attainment of the JCS target strength from mid-1952 to mid-1954 and maybe to a later date.

Taft on Air Power

Republican leader Sen. Robert Taft's floor speech picturing the Senate as bold and farsighted on air power left listeners dazed.

Taft said:

"Let me state what the circumstances were in regard to the 70-group Air Force. The Senate voted for it. Then the Senate voted for it a second time. The conferees on the part of the Senate stood up for it, against the conferees on the part of the House. Finally, the entire delegation visited the President. He said, 'Even if you put provision for the 70-group Air Force in the bill, I will not use the money.'"

The fact is the Senate, including Taft, overwhelmingly, and with insistence, backed the Truman-Johnson slash in the 70-group Air Force program.

This is the record:

Early in 1949, the House, under the leadership of Chairman Carl Vinson of its Armed Services Committee and Chairman George Mahon of its Armed Services Appropriations Subcommittee, added $578 million for plane procurement to the 1950 fiscal year Truman-Johnson USAF budget to implement the 70-group build-up.

Senate Appropriations Committee struck out the additional money.

The Senate concurred, voting 49 to 9, on August 26, 1949, against restoration of the $578 million. Taft was among the 49 opposing the 70-group funds.

Backed by this overwhelming support, Senate conferees refused to give in to the House insistence on the 70-group build-up. Finally, on October 10, the House, 305 to 1, directed its conferees to continue their insistence.

At this point, former Sen. Elmer Thomas, then Chairman of the Senate Armed Services Appropriations Subcommittee, and other members of the group called at the White House. They reached an understanding that the President would impound the 70-group funds, even if they were voted, Thomas told reporters at the time. Because of this understanding, he said, the Senate would give in to the House—which it did.

The President and former Defense Secretary Louis Johnson subsequently more than made good on the agreement. The President impounded the $578 million; Johnson cut an additional $183 million off USAF procurement funds.

Given a choice between strategic and tactical air, USAF saw fit to economize on the tactical side.

CAB Friends and Influence

Republican Sen. Owen Brewster has put Senate Democrats on the spot by publicly urging an investigation of airline influence over CAB and the White House.

Informed observers mark it down that Brewster is no more anxious for the investigation than the Democratic leadership. An unveiling of airline politicking, observers think, would feature members of both political parties.

Brewster's maneuver has put responsibility for any failure to have an investigation on the Democratic leadership.

The situation shapes up like this in the Senate:

• **Small Business Committee** will open hearings on the nonskeds' role in air transportation this week or next. The nonskeds are calling for investigation of scheduled airline influence. This could lead into reviews of the Pan American-American Overseas merger and other cases.

But Chairman Edwin Johnson of Senate Interstate and Foreign Commerce Committee, and Sen. Brewster, have made it clear they will insist that Small Business keep within its jurisdiction and not invade Commerce Committee's territory.

• **Interstate Commerce Committee.** If this group goes ahead with a CAB investigation, it's generally expected that it will be mild, except for one factor: Committee member Charles Tobey. He's the Senate's leading crusader against evils in government.

Sen. Warren Magnuson commented: "What we need is constructive legislation, instead of more investigation." It seems to be the general attitude of the committee.

• **Expenditures in Executive Department Committee.** Sen. William Fulbright, whose Banking and Currency Subcommittee investigated Reconstruction Finance Corp., has suggested that this group follow through with investigations of Maritime Commission, CAB, and other agencies. But there's no indication yet that this committee will look into CAB.

• **Public Welfare Committee.** A subcommittee headed by Sen. Paul Douglas, who also figured in the RFC probe, is considering the Fulbright bill to establish a ten-member commission of private citizens to evaluate morals and ethics in government and draw up a code of behavior for officials.

—**Katherine Johnsen**

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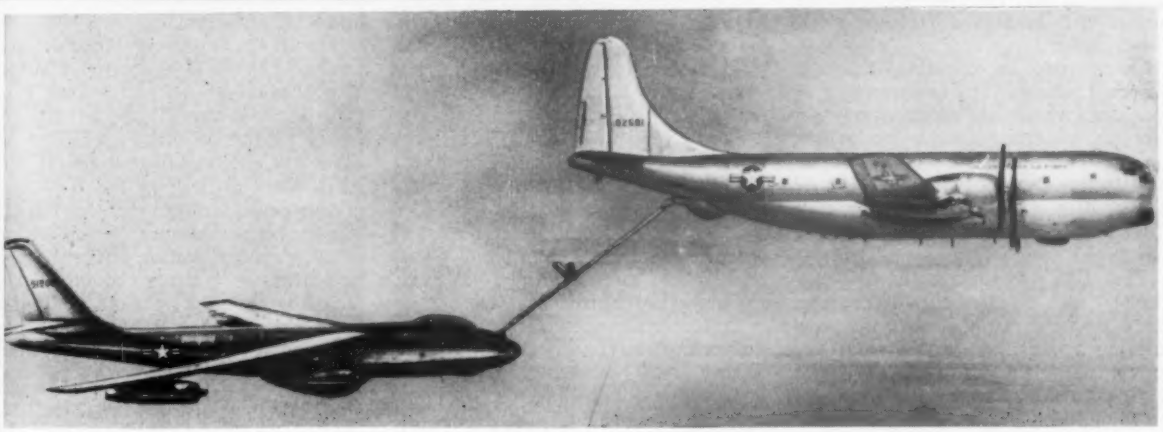


Fueled in Flight

Recent brief announcement of successful in-flight refueling of the Boeing six-jet-engined B-47B brings a step nearer the global combat effectiveness of the Strategic Air Command.

Serious drawback to SAC's fastest atom-bomb carrier has been its long-range-flight limitations. Although range of the B-47 unrefueled is known to exceed 2300 mi.—the XB-47 two years ago flew approximately that mileage from Larson AFB, Wash., to Andrews AFB, Md. It is still considered short-range in terms of the SAC mission. Desirable combat radius sought by SAC for bombers is 5000 mi. with bomb load. Successful in-flight refueling brings the B-47 close to this requirement.

▶ **All-Weather Problems**—Biggest problem yet to be solved is the present inefficiency of radar equipment in effecting a pin-point homing of the two aircraft for the refueling operation. So far, actual refueling operations are still almost completely dependent—upon visibility.

Present radar homing equipment, such as is used aboard current production aircraft (B-47, B-50, B-29, B-45, F-84), leaves much to be desired for all-weather refueling, an Air Force official said. Recently published reports indicating that an all-weather flight refueling contact can be accomplished in 10-15 minutes are highly optimistic, he declared, although such accuracy might be possible in another year or two.

All-weather technique, according to top Air Force sources, is still theoretical. And much of SAC's combat effectiveness depends upon its all-weather capabilities. In-flight refueling will be of little military value unless it can be accomplished under heavy-weather conditions, Air Force sources say.

During experimental tests conducted in February by Boeing flight crews near Wichita, Kan., feasibility of in-flight refueling of the fast all-jet B-47 was definitely borne out. Anticipated problem of holding the jet bomber to C-97 cruising speed during contact and transfer operations failed to materialize.

During the tests, USAF's B-47 No. 60566 made a series of successful refueling contacts with a Boeing KC-97A similar to that shown in the AVIATION WEEK composite photograph above.

▶ **How Boeing Does It**—Just forward of the B-47 pilot cabin are folding slipway doors which, when opened by the pilot in preparation for refueling contact, exposes the receptacle into which the fuel is to be forced under pressure transfer.

The Boeing boom refueling system, which some Air Force quarters believe to be the best answer so far to heavy bomber refueling, is made up of two telescoping pipe sections. The boom is attached to the tanker's fuselage by a yoke and trunnion set up for control guidance.

An over-size blister "cockpit" at the base of the trunnion is used by the boom "pilot," who actually flies the refueling boom into contact with the bomber fuel receptacle. The boom piloting is maintained by two control surfaces which Boeing has named ruddevators. The boom pilot sitting in his blister beneath the C-97 tail controls the ruddevators by a conventional airplane control stick.

AF Pushes Buildup of B-47 Jet Bomber

By Alexander McSurely

Dayton—The high-speed Boeing B-47 jet bomber rapidly emerging as a very important Strategic Air Command striking weapon of the immediate future, is undergoing an Air Force buildup comparable only to the high priority B-29 program of World War II.

New tipoff to the high Air Force emphasis on the Stratojet bomber is the recent assignment of Brig. Gen. O. F. Carlson as head of the combined USAF B-47 project, succeeding Maj. Gen. S. R. Brentnall, who now becomes head of the new Air Materiel Command Directorate of Production and Service Engineering.

Brentnall started the combined project last November after creation of the new separate Air Force Research and Development Command took away most of his former duties as AMC director of research and development.

Assignment of Carlson to succeed him as overall B-47 coordinator for four Air Force commands—AMC, Strategic Air Command, Training Command, and Air Proving Ground—means that groundwork laid by Brentnall for the high-priority bomber will continue full speed ahead.

▶**Headquarters at Wichita**—Carlson is expected to set up headquarters at Wichita, where his organization will monitor mounting production at the Boeing plant, and later at the Tulsa plant where Douglas will build the B-47 as a licensee. He moves to his new post from that of director of research, USAF Office of Flying Safety.

Objective is to phase in the B-47 production with requirements of Strategic Air Command while monitoring crew training programs, organization of ground support personnel crews, service testing of the new airplanes, and tactical testing under the Proving Ground Command.

Tentative plans call for training of B-47 crews at the Wichita airport, recently taken over by USAF, so that the planes used for training will be close to the factory for spares, modifications and overhauls as needed.

▶**Flight Training**—Question as to whether flight training on the same base where new airplanes are getting their first test flights will prove satisfactory is being carefully weighed. Present opinion is that advantages of being close to the home factory for the flight training will outweigh disadvantages of possible interference with initial flight tests and consequent possible slowdown of deliveries.

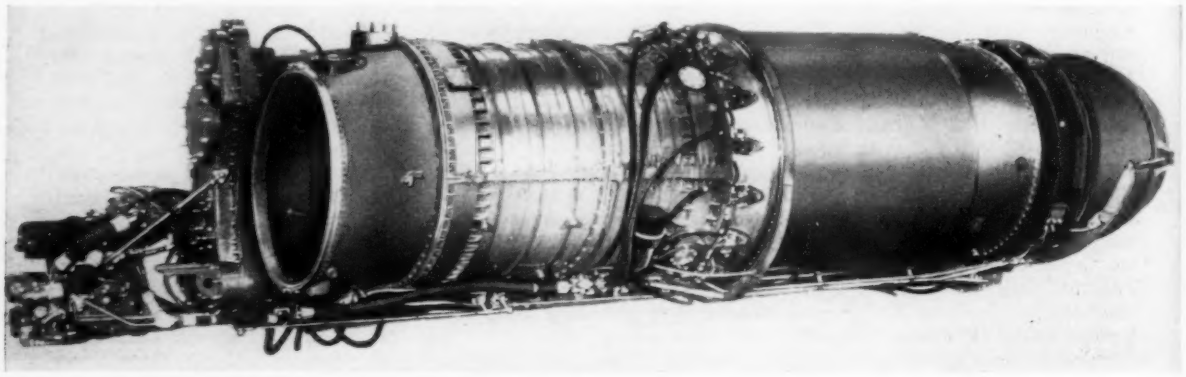
Gen. Carlson will include in his project the accelerated service flight testing program on B-47s which has already been started in Wichita by Col. Paul W. Tibbetts, (World War II pilot of the Enola Gay B-29 atom bomb plane) under the project named WIBAC (Wichita Boeing Airplane Co.).

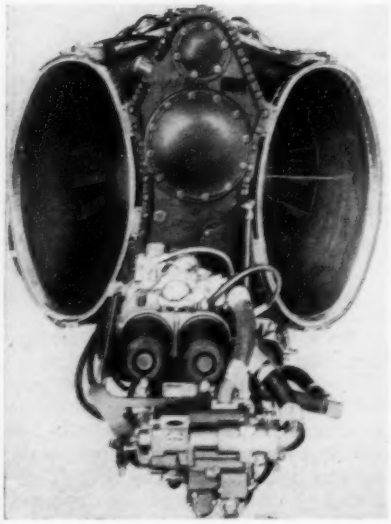
Procurement supervision on the B-47 program will be continued by Maj. J. H. Shaffer, AMC Procurement Division bombardment branch B-47 buyer and chief B-47 project officer. Under the usual setup, the buyer is responsible for seeing that the contract is fulfilled, that initial spares are provided and that factory training and familiarization programs are carried out.

▶**Processing**—Indications are that each of the four commands will process the B-47 much as any airplane, except for the fact that Gen. Carlson and his staff will be in the driver's seat to see that the best attainable answer is sought for any problem which might delay the ultimate goal of getting the fast jet bomber into SAC squadrons.

The B-47 project is probably best compared to the B-29 project of World War II administered by the then Brig. Gen. K. B. Wolfe. Wolfe left the key job of production division chief at Air Materiel Command to go to Smoky Hill AFB, Kan., as head of the B-29 high priority program which succeeded in getting the big bombers into action in time to carry a major portion of the strategic bombardment campaign against Japan, including the decisive atom bombings. Since the war, the B-29 project commander has advanced to USAF Deputy Chief of Staff, Materiel, with the rank of lieutenant general.

Gen. Carlson will have the same title as was given to Gen. Brentnall—"Special Assistant to the USAF Chief of Staff in charge of the B-47 program and the B-52 program"—indicating that eventually the Air Force expects to phase in a second high priority program for the Boeing eight-jet B-52.





Westinghouse Y-Ducted J-40

These first pictures of the Westinghouse J-40-WE-6, one of the recently announced turbojets in the high-thrust bracket, show front end (left photo) and side features of the engine.

Gearbox is disposed between twin elliptical air intakes, with what appear to be fuel pumps and fuel regulator installed below and forward.

Compressor shell is in two sections vertically, which leads to conjecture that the engine's air-packing unit does not follow conventional design. The installation might comprise two compressor stages—low and high—with the casing split between them for easy access.

Combustion section, probably the annual type, tapers into a turbine section which appears sufficiently wide to accommodate more than wheel.

Control rod at extreme right leading to end of tailpipe should be for variable nozzle actuation, a feature which is also included in Allison's new J-35-A-23.

Engine is reported slated for two new Douglas planes—F4D night fighter interceptor and A3D attack—and may go into McDonnell's F3H, sweptwing version of F2H Phantom.

Westinghouse claims that the J-40 delivers more thrust than any other jet engine known to be produced in the world today.

Similar claims have been made by other manufacturers for their own jet engines.

Army Plane Purchases to Grow

More dollars flow to aircraft industry as Army need for 'air transportability' continues to increase.

Army demands upon all facets of the aircraft industry are expanding greatly because modern warfare requires that the service eventually be completely air transportable, a top ranking Army official declared last week in an interview with AVIATION WEEK.

To emphasize the growing impact upon the aircraft industry, he cited the fact that the Army had jumped from a $10 million aircraft procurement in 1949 to more than $90 million in 1951 budgets. He predicted that the Army's fiscal 1952 aircraft budget would double that of 1951, (and would probably go still higher in 1953).

▶**Where Dollar Goes**—More than two-thirds of the Army procurement dollar will go for rotary-winged aircraft, about 20 percent for fixed-wing types and the remainder for parts and equipment.

• **Executive transport.** Of funds programmed for actual plane procurement the Army will buy a limited quantity of four-place light utility twin-engine aircraft. These will be convertible to either executive transport or light cargo. New emphasis is to be given rapid air transport of Army brass.

• **Liaison helicopter.** Most important move in Army aircraft procurement is a plan to completely switch all liaison activity from fixed-wing aircraft to the helicopter.

Further development of the helicopter by the Army and USAF will see the heavy versions, such as the Piasecki H-16, handling the bulk of rapid movement of troops from one forward area to another, this source predicted.

To develop technique for helicopter assault troops, the Army recently established two helicopter companies which are to be equipped with the Sikorsky H-19 and the Piasecki H-21. Experience gained by actual use of this equipment will provide basis for quantity programming by the Air Force in the heavy helicopter fields during the next two years.

▶**Heavy Airlift to AF**—Heavy airlift of troops will remain the mission of the Air Force, this official stated. Army has no desire to get an air force of its own. Neither does the Air Force desire an army of its own. Airborne and air-ground technique is exceedingly complex and both services are working to overcome its inadequacies.

The problem of weight limitations currently observed by both services are an arbitrary weight, agreed to by both services to facilitate a more rapid development of aircraft. It was agreed that the Air Force would have cognizance of aircraft procurement and development of planes in excess of 2500 lb. and helicopters in excess of 4000 lb.

There is need of a revision of that regulation, this official declared, and it is now under consideration by the Army and Air Force chiefs of staff. It is still in effect at the present time but will probably be revised to permit the Army to purchase any type aircraft regardless of weight classifications for experimental purchases and in limited quantities providing it is in consonance with USAF requirements.

▶**Current Barriers**—Currently, the problem of building an all-air transportable army is beyond the capabilities of the nation's purse and physically beyond the present capacity of the aircraft industry with production commitments to the other services.

So far, he pointed out, the bulk of one entire infantry division cannot be totally air-lifted. Today, Army and Air Force procurement is aimed at building an air support force which would enable just one division of infantry to be moved by air in a single airlift. By and large, this equipment includes procurement of aircraft with payload capacity of more than 25,000 lb. to meet the strategic airlift requirement.

While composition and equipment of the infantry (regular) division and the airborne division are essentially the same, additional training in the paratroop technique is given the airborne unit. Strictly speaking, the airborne division is not completely airborne, since tank elements of the division are currently delivered by surface transportation or self-propelled into the combat areas.

▶**Concept Shifting**—At the close of World War II, when the Army was partially demobilized, two airborne divisions were retained intact to enable the Army to develop equipment for its airborne army. Considerable knowledge, technique and new types of equipment have evolved, but the concept is shifting now—from attempting to redesign the division to meet the airlift—to redesign of the airlift to meet the requirement of the division.

Initially, as the Army moved towards becoming air transportable, it was decided that Army ground equipment must be radically altered to meet airlift requirements. Research and development was aimed in that direction and considerable progress has been made in building specialized equipment lighter and more compact for air movement.

Certain ground equipment, tanks in particular, integral battle necessities for ground war cannot be greatly redesigned to meet the airlift and still meet the Army requirement. To meet this need the Air Force is procuring, in considerable **quantity, heavy transports** such as the Douglas C-124 which can airlift a 25-ton tank to rear area airbases.

Based upon joint Army-USAF requirements, the Air Force has submitted proposals for a heavy duty transport to the industry. This plane must be capable of carrying a 25,000 lb. payload 2000 mi. non-stop, land its cargo on a marginal air field. The plane must be capable of rear-ramp loading and discharging its cargo directly onto the ground.

▶**Air Transport Role**—During World War II Army became acutely aware of the necessity of air transport. It promoted the use of gliders for assault transport but was dissatisfied because of the high loss ratio of troops landed by gliders into combat areas. As the next most practicable method it developed the airborne paratroop method which met with considerable success from a shock-troop point of view but has not been notably successful for sustained battle action.

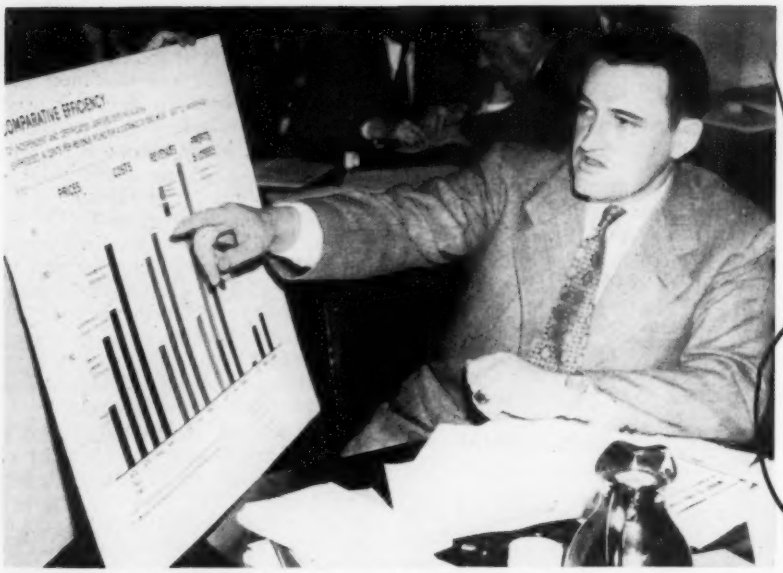
Great strides have been made by the Army and the Air Force towards moving the Army by air, he said, but so complex are the problems of logistics that a virtual revolution in some phases of aircraft design for transport are in order. Today, most military air transports are simply conversions of commercial designs to military usage and for the most part do not meet the military requirement.

At the present time Army air transport is moving into the assault transport stage as an interim measure until helicopter development can cope with delivery of heavy equipment to the front.

Army places great store in comparatively short ranged transports which can deliver heavy equipment directly into the battle area, land on marginal fields and discharge its cargo. To meet the immediate need the Army and Air Force, through evaluation of the most suitable types, have decided upon the Chase Aircraft Co.'s XC-123, the Army official declared; and it is scheduled to go into production this year in considerable quantity.

Later, perhaps in 1953-4, he continued, movement of equipment from a rear area (such as Pusan in Korea) to the battle area, will be handled almost entirely by heavy duty helicopters.

As has been the case with other new theories in the art of war, the trend toward air transport for troops and materials must undergo considerable battle-testing. High military officials realize no amount of field drills can provide the same trial as actual test-under-fire.



FIGURES AND FIREWORKS were Amos Heacock's tools in Senate committee hearing.

Non-sked Head Blast at Airlines

Verbal fireworks were set off at a recent Senate Interstate Commerce Committee session by Amos Heacock, Air Coach Transport Assn. president.

Heacock appeared in opposition to confirmation of the nominations of Delos Rentzel as Undersecretary of Commerce for Transportation and Donald Nyrop as Chairman of the Civil Aeronautics Board. But his testimony was mainly directed to criticism of the scheduled airlines and CAB actions he claimed were partial to the scheduled industry.

Early confirmation of the Rentzel and Nyrop nominations, along with that of Charles Horne to be Civil Aeronautics Administrator, is expected.

Committee members challenged Heacock at three points:

• **When Heacock laid full blame** for Board decisions at Rentzel's door, New Hampshire's Sen. Charles Tobey heatedly objected: "Board actions are by the vote of five men. You are not being factual, are you?"

• **Heacock's statement** that Robert Ramspeck, former executive vice president of Air Transport Assn., as Chairman of the Civil Service Commission will influence CAB actions in favor of the scheduled airlines, met with sharp criticism by Tobey and other senators. Heacock said:

"If Civil Service personnel, in lower echelon policy-making functions at CAB do not see eye to eye with the scheduled airlines they can be transferred or replaced from key positions. For example, James Verner, formerly with ATA, is Administrative Chief with the CAB. In this position he can oversee the work of all of the employes of the CAB, and promotions and demotions can be controlled under Civil Service."

Tobey angrily retorted: "That's insinuation and innuendo that I do not like. Are you insinuating that in his position he (Ramspeck) can transfer Civil Service employes if they do not see eye to eye with the scheduled airline position?" Heacock said it is "possible." "All things are possible," Tobey replied.

• **Heacock's report** that in two hours he worked out a plan for equitable separation of subsidy from air mail pay—a project the Senate Commerce Committee, with the aid of an accountant firm, has been working on for over a year—brought the response from its chairman, Sen. Edwin Johnson: "Anyone who makes a statement like that is making an 'ass' of himself and appears ridiculous to anyone who knows anything about the subject."

Senators later gave strong support to Heacock's complaints against sensational articles in the March Cosmopolitan magazine, entitled, "Death Rides the Bargain Air Lines."

Tobey commented: "If you can't win a suit under the libel laws, the libel laws should be changed."

Rentzel told senators he "deplored" the articles and "wouldn't be a bit surprised if the scheduled airlines did it."

Sen. Johnson suggested the publicity would frighten the public from all types of air transportation. "The public doesn't make the technical distinction between scheduled and non-scheduled operations."

Navy Expanding Rocket Test Base

To expedite development of rocket engines, Navy has ordered a $10 million expansion of its Lake Denmark, N. J. test facility during the next 5 years. In agreement with Air Force, Navy will provide East Coast contractors with test facilities at Lake Denmark and USAF will provide the same service at Muroc, Calif.

At the present time, the facility into which Navy has already poured some $16 million for static test equipment is being used by Reaction Motors, the Kellogg Co., USAF, Army and several other government agencies along with BuShips and the Office of Naval Research.

Master development program for the base was laid out by the M. W. Kellogg Co. Three years ago the company prepared a ten-volume program which would have cost Navy originally $14,500,000. Because it was conceived during the Louis Johnson regime, that figure was whittled to $7,500,000; was approved by the Navy Aeronautical Board, Defense Department and was finally authorized by Congress in 1950. Presently approved funds will be used to expand and improve present facilities and the additional $2,500,000 is to be programmed from fiscal 1952 funds, it is reported.

► **Reason for Site**—Site of the Naval air rocket test station was selected at Lake Denmark because the location was in a remote N. J. area, yet just a few miles from New York City, within 300 mi. of major East Coast rocket engine manufacturers and within easy flying distance of Washington and Wright AFB, Ohio.

The site had been declared surplus to Navy's Bureau of Ordnance and contained several miles of paved roads, railroad track, military housing and dozens of warehouses suitable for conversion to shops, laboratories and administrative buildings.

The test base is equipped to offer the civilian contractor any assistance in the testing or evaluation of rocket propellants; to develop any specialized test equipment necessary for instrumentation and test if it is not already available.

A corrollary program also scheduled for expansion because of the general increase in the guided missiles program of Navy is to train personnel in the handling, servicing and operation of rocket engines, components and equipment for service use.

► **Focal Point**—Today the station is the central storage and issuing point for liquid rocket propellants on the East Coast for all BuAer activities. Test stands are located all over the 650 acre area and pointed in different directions

to provide comfortable safety barriers between test stands.

Other functions of the test station are to provide engineering services in connection with flight test projects. Engine of Navy's Viking rocket rated at 20,000-lb. thrust, for example, was tested at Lake Denmark as part of the station's work.

Besides specific contractor-devised tests, the station is geared to evaluate the performance of rocket engine components and associated equipment. The station is currently running evaluation tests on simulated altitude performance of engines; number of runs possible on one engine without overhaul maintenance; the operation of ignition systems after long storage delay and the effects of extreme heat and cold upon ignition system.

The facility is designed particularly to provide test area for engines developing more than 10,000-lb. thrust. Normally high cost of construction of rocket test stands and outfitting them with tankage and instrumentation rises rapidly with the thrust capacity.

In addition to absorbing some of the contractor's test costs through government financed facility, by making those same facilities available to other contractors, the station provides a test area remote from heavily populated areas. Most East Coast contractors are located so near cities that firing tests of really large engines are precluded because of excessive noise.

What Aviation Pays Executives

New listing of airline officers salaries and stock holdings filed.

Manufacturers report to SEC show officials' salaries going up.

More 1950 salaries and stock holdings of executives and directors have been announced by the following U. S. trunklines and local service operators (1949 figures in parentheses):

• **Continental Air Lines:** President and director, Robert F. Six, $32,750, 1000 common shares ($30,000, 1000 shares); chairman of the board, Louis R. Mueller, 22,450 common (22,450 common); vice president and director, C. C. West, Jr., $16,375, 440 common ($15,000, 300 shares); vice president, operations, O. R. Haueter, $16,375, 763 common ($15,000, 763 shares); vice president, secretary and treasurer, Joseph A. Uhl, $14,191, 1217 common ($12,916, 1117 ½ shares); assistant secretary, Dorothy R. Peri, $4275 and 50 common ($3966, 50 shares); and the following directors: Lawrence C. Ames, 9500 common (7800); Sheldon G. Cooper, 5600 common (5600); Leonard B. Daniels, 14,500 common (14,200); Frederick L. Ehrman, none; Marco F. Hellman, 4500 common (4500); Josiah G. Holland, 2300 common (2600); Frank H. Ricketson, Jr., 4300 common (500); Thomas Roberts, 62,050 common (62,050).

• **Braniff International:** President, T. E. Braniff, $30,000, bonus of $3369, 278,224 common ($28,500, bonus of $3256, and 279,824 common shares); executive vice president, C. E. Beard, $24,250, bonus of $1983 and 100 common ($23,000.07, $1890, and 100 shares); vice president, R. C. Shrader, $17,625, bonus of $1888 and 1200 common ($16,875, bonus of $1832 and 1200 shares); secretary-treasurer, C. G. Adams, $17,625 bonus of $1624 and 1900 common ($16,875, bonus of $1568 and 1900 shares); vice president, John B. Walker, $23,041 and 200 common ($11,666 and 1200 shares); assistant treasurer, O. W. Crane $8475, bonus of $528 and 350 common ($8400, bonus of $622 and 350 shares); asistant secretary, R. L. Barrier, $7250 and bonus of $432 ($7200, bonus of $428 and 30 shares); and the following directors: Hal C. Thurman, $15,000, bonus of $999 and 2321 common ($15,000, bonus of $999 and 2321 shares); Ferdinand Eberstadt, bonus of $500 and 100 common (bonus of $250 and 100 shares); Roger Whitehead, $250 and 150 common ($250 and 150 shares); Fred Jones, $750 and 1000 common ($250 and 1000 shares); George Butler, $750 and 5000 common ($250 and 1600 shares).

• **Inland Airlines:** Secretary-treasurer and director, Paul E. Sullivan, no salary, 1 share capital stock (no 1949 report); assistant secretary-treasurer and director, J. J. Taylor, no salary, 1 share capital stock; assistant secretary R. K. Nichols, no salary, no stock.

Seven local service airlines have announced executive and directors' salaries, bonuses, and stock holdings for 1950:

• **All American Airways, Inc.:** President and director, R. M. Love, salary, $15,000, 78,845 common ($15,000, 78,845 common); vice president and director, C. W. Wendt, $10,000, 6500 common ($10,000, 11,700 shares); vice president and director, H. B. Bazley, $10,000, 2900 common ($10,000 and 2900 shares); vice president, operations, C. H. McIntosh, $10,000 (none reported last year); vice president, sales, D. L. Miller, $7500, 27 common ($7500, 27 shares); secretary, E. K. Arnold, $5300 and 500 common (none reported last year); asistant secretary, H. G. Kenyon, $5700 ($5700, 100 shares); assistant treasurer, W. J. Short, $6600 ($6600); and the following directors: Martin Fenton, 100 common (1000); Hamilton Hale 1500 common (1000); Harry W. Lunger, 13,500 common (13,500); Malcolm McAlpin, 500 common (500); Hugh R. Sharp, 200 common (200); William R. Waldeisen, none.

• **Bonanza Airlines, Inc.:** President, Edmund Converse, salary, $12,000, 16,095

Top salaries paid by aircraft manufacturing firms during 1950 are listed in a partial survey by AVIATION WEEK. Companies not covered in the current survey will be reported later.

Salary details (with 1949 compensation in parenthesis):

• **Douglas Aircraft Co.:** Donald Douglas, president, $121,300, plus $10,079 pension fund payment ($102,400, plus $5756 pension fund payment); F. W. Conant, vice president, $50,775, plus $3768 retirement fund payment ($45,150, plus $2785 pension fund payment); Arthur E. Raymond, vice president, $50,675, plus $5724 retirement fund payment ($44,950, plus $3918 pension fund payment). Total for all officers and directors: $350,088, plus $25,363 in pension fund payments ($351,682, plus $18,385, in pension fund payments).

• **Curtiss-Wright Corp.:** Paul V. Shields, chairman of the corporation, $102,280, ($70,883); Roy T. Hurley, president, $89,380, plus $74,656 incentive payment ($29,526); Joseph F. McCarthy, vice president, $56,466, plus $29,862 incentive payment ($51,584); all officers and directors, $342,367, plus $129,653 in incentive payments and $3391 in retirement payments ($439,650, plus $6505 in retirement payments.

• **Ryan Aeronautical Co.:** T. Claude Ryan, president, $32,000, plus $8860 retirement payment ($30,833, plus $3685 retirement payment); all officers and directors: $102,645, plus $24,731 in retirement payments ($96,661, plus $10,000 in retirement payments).

• **United Aircraft Corp.:** Frederick B. Rentschler, chairman, $102,650 ($103,450); H. Mansfield Horner, president, $103,230, plus $50,000 incentive payment and $3298 retirement payment ($103,100, plus $40,000 incentive payment and $7610 retirement payment); Raycroft Walsh, vice chairman, $62,290, plus $20,000 incentive payment ($63,350, plus $20,000 incentive payment); Leonard Hobbs, vice president, $73,250, plus $35,000 incentive payment and $8333 retirement payment ($73,400, plus $30,000 incentive and $7565 retirement payment); all officers and directors, $691,726, plus $235,000 incentive payments and $50,407 in retirement payments ($683,350, plus $202,500 in incentive and $52,658 in retirement payments).

• **Consolidated Vultee Aircraft Corp.:** LaMotte Cohu, president, $75,000, plus $10,586 retirement payment ($72,500, plus $4724 retirement payment); Robert Watts, vice president, $36,000, plus $4041 retirement payment ($36,000, plus $3366 retirement payment); R. H. Biron, jr., vice president, $27,917, plus $1836 retirement payment; W. C. Rockefeller, director, $26,750; all officers and directors: $354,083, plus $26,242 in retirement payments ($371,790, plus retirement payments of $19,071).

• **North American Aviation:** J. L. Atwood, president, $85,000, plus $6400 retirement payment ($85,000, plus $6400 retirement payment); J. H. Kindelberger, chairman of the board, $125,000, plus $11,452 retirement payment ($125,000, plus $11,452 retirement payment); R. A. Lambeth, vice president, $33,675, plus $2008 retirement payment ($30,000, plus $3767 retirement payment); Raymond Rice, vice president, $43,837, plus $2888 retirement payment ($42,000 plus $2888 retirement payment); all officers and directors, $346,102 ($334,760).

• **Grumman Aircraft Engineering Corp.:** L. R. Grumman, chairman of the board, $50,300, plus $10,093 retirement payment ($50,200, plus $9718 retirement payment); L. A. Swirlbul, president, $60,250, plus $10,494 retirement payment ($60,200, plus $10,141 retirement payment); William T. Schwendler, $41,133, plus $7149 retirement payment ($40,200, plus $5716 retirement payment); E. Clinton Towl, vice president, $27,716, plus retirement payment of $3766 ($27,150 plus retirement payment of $3597); all officers and directors: $215,283, plus $36,726 retirement payments ($211,300, plus $33,919 retirement payments).

• **Republic Aviation Corp.:** Mundy Peale, president, $69,350 ($61,100); Alexander Kartveli, vice president, $50,550 ($47,150); Thomas Davis, secretary-treasurer, $33,500 ($30,000); all officers and directors: $289,630 ($199,250).

• **Beech Aircraft Corp.:** Walter H. Beech, president, $51,442 ($54,992); O. A. Beech, secretary-treasurer, $35,610 ($35,935); John P. Gaty, vice president, $38,170 ($40,036); T. A. Wells, vice president, $38,170 ($39,986); all officers and directors: $219,630 ($220,847).

• **Cessna Aircraft Co.:** Dwane Wallace, president, $28,667 ($32,250); all officers and directors: $70,400 ($74,063).

• **Northrop Aircraft Inc.:** Oliver Echols, $60,000; John K. Northrop, president, $50,000 ($60,833.); all officers and directors: $282,472 ($311,921).

• **Piper Aircraft Corp.:** All officers and directors: $53,292, plus $1084 retirement payment ($58,398, plus $3621 retirement payment).

shares of common, and 12,322 shares preferred ($6000, 16,095 common, 7322 preferred); vice president Wesley Durston, no salary, $15,550 common, 21,690 preferred (15,500 common, 13,006 preferred); secretary and treasurer, Florence J. Murphy, $6150, 100 common ($3408); assistant treasurer, Earl Jochim, $5550, (no report for 1949); vice president, traffic, M. E. Cole, $8100; and the following directors: L. G. McNeil, 1000 common (1000); Morley Griswold, 2500 preferred (2500 common).

• **Frontier Airlines, Inc.:** President and director, H. S. Darr, salary, $14,000, 3300 common (not available); executive vice president and treasurer, C. A. Myhre, $5833; vice president, operations and director, R. M. Wilson, $5833, 119,010 common; vice president, traffic and sales D. A. Duff, $5833, 15 common; secretary and director, E. N. Levin, 163,743 common; assistant secretary, D. T. Myers, $1395, 34 common; assistant treasurer, E. W. Sexton, $2350; and the following directors: Fred Manning, 6000 common; Del E. Webb, 750 common; and Sam Snead, 300 common.

• **Helicopter Air Service:** President, treasurer and director, T. H. Reidy, $12,000, 19,375 common ($12,000 salary, 19,375 common shares); vice president, operations, C. W. Moore, $7850, (no report for 1949); secretary and director, C. E. Cessna, 250 common (250 shares); assistant secretary, assistant treasurer, R. B. Kiel, $5504 ($4569); and the following directors: R. C. Rodman, 5075 common (5075); and S. J. Walker, 1500 common shares.

• **Ozark Airlines:** President and director, Laddie Hamilton, $5000, bonus of $200, 250,000 shares of B stock (no 1949 report); chairman of the board, B. T. Mattingly, bonus of $600, 120,000 shares of B stock; vice president and director, J. B. Carl, $4000, bonus of $200; secretary and director, A. G. Heyne, bonus of $800; treasurer and director, F. W. Jone, $3000, bonus of $200, 375,000 B shares; and the following directors: O. L. Parks, $1900 and bonus of $80; G. O. Shaver, $1900 and bonus of $80; and C. A. Bachman, $1040 and bonus of $80.

• **Piedmont Aviation:** President, treasurer and director, T. H. Davis, $12,250, 120,671 common ($12,000, 106,671 common); vice president, assistant to president and director, R. D. Hager, $10,083, 9850 common ($10,000, 4450 shares); vice president and director, R. S. Northington, $5400, 4400 common ($4800, 500 shares); secretary and director, M. F. Fare, $5275, 3501 common ($4800, 1276 shares); and the following directors: G. E. Anderson, bonus of $175, 1000 common (1000 shares); Thurman Chatham, 3400 common (3400); E. L. Davis, bonus of $175, 15,000 common (25,000 shares); E. L. Davis, Jr., bonus of $175, 4676 common (4676 shares); W. Frank Dowd, 1000 common; C. E. Norfleet, bonus of $175, 5000 common (5000 shares).

• **Robinson Air Lines Corp.:** Executive vice president, Robert E. Peach, $10,166, 626 capital shares ($10,000, 626 capital shares); vice president and secretary, John R. Carver, $7266 and 518 capital shares ($8440, 518 shares); and the following directors: L. Nelson Simmons 350 capital shares (350); Ralph C. Smith, 400 capital shares (400); E. V. Underwood, 2500 capital shares (2500 shares); Edwin A. Link 18,383 ⅓ capital shares (none in 1949).

Draper Heads MIT Aero Department

Dr. Charles S. Draper has been appointed head of the department of aeronautical engineering at the Massachusetts Institute of Technology, succeeding Dr. Jerome C. Hunsaker. Dr. Draper's appointment was announced by Dr. James R. Killian, Jr., president of MIT.

Dr. Hunsaker, who asked to be relieved of administrative responsibility for the department, will continue as a professor until his retirement next year.

Dr. Draper is a member of the Scientific Advisory Board of the Air Force and a panel member of the Research and Development Board of the National Military Establishment. His research achievements in the field of anti-aircraft fire control systems have brought him many awards, including the Exceptional Service Award by the Air Force.

NPA Changes Rule On Columbium DO's

National Production Authority has ordered that DO's for columbium and columbium-tantalum-bearing steels for the aircraft industry must now be approved by the Aircraft Production Resources Agency, Department of Defense, in addition to the NPA DO certification.

The new order, published Apr. 6, amends order M-3. NPA explained that the action was taken to assure a more effective distribution of the columbium bearing alloys to engine manufacturers.

The new ruling, clarifying the original M-3 regulation, does not change the recently issued regulation M-49. This latter implements M-3 and reserves production and use of columbium bearing stainless steels for defense needs. Products covered under the regulations include: ferrocolumbium, ferro tantalum, ferro columbian-tantalum, and columbium-stabilized steels (mill products and castings).

In another action, NPA ordered still larger reservations of supplies in the aluminum industry to meet DO orders because of increased military requirements. This ruling, amending NPA order M-5, requires an additional 15 percent reserve by aluminum producers or fabricators, and an additional 20 percent by distributors and jobbers of aluminum products, for filling rated orders.

SAE's Annual Meet

The Society of Automotive Engineers' National Aeronautic Meeting and aircraft engineering display begins today in New York's Hotel Statler.

The three-day technical sessions will cover a wide range of papers dealing with jet design and operational factors, transport problems, helicopters in local air service, flying boat development, and engine oil studies.

Windup of the program will be an air show on Apr. 19, at New York International (Idlewild) Airport, featuring display and flight demonstration of jet bombers and fighters, helicopters, commercial and personal aircraft. Included will be American, Canadian and British planes.

SIDELIGHTS

(Continued from page 8)

other nonskeds') certification proceedings. The line voluntarily cancelled the project to avoid any suggestion if influencing the press as to Board decisions.

Airlines

Since it grounded its Martin 2-0-2s, **Northwest** has been advertising as "the only airline featuring four-engine airliners on every flight." **Aerovias Guest** stopped trans-Atlantic flights between Mexico City and Spain because of currency restrictions imposed by Spain.

Congress

The Small Business Committee is receiving a report on **subcontracting** prepared by Aircraft Industries Assn., on three principal west coast members.

CAA

Agency is preparing a compilation of various ways in which **fixed-base operators** are boosting income; ready in about two months . . . **Manual 8, Aircraft Airworthiness,** restricted Category, describes rules for certificating planes in special categories, such as how to convert a plane to spraying & dusting, aerobatic maneuvers, etc. . . . **Sixth Regional HQ** is hit by "reverse militarization." These have gone or are under orders for active duty with USAF: Lt. Col. Charles R. Hawkes, Jr., deputy chief of aircraft engineering division, to Wright Field; Majs. George Bogert and Leonard Williamson and Lt. Col. John Busey, design evaluation engineers; Lt. Col. Richard Bache, chief of aircraft engineering branch; Col. Robert E. Dake, chief of flight operations division; Col. Clarence "Clancy" Schmid, chief of flight operations branch, to Europe; Maj. Al Ammon, scheduled air carrier inspector. Jim Read is acting chief while Col. Joe Marriott is on two months' duty in Washington CAA. Waldo Klikoff will report to the region from Seattle. Plans recently were to shift R. L. Lippis, chief of Seattle aircraft engineering branch, and Clark Biesiemier, chief of aircraft engineering branch at Ft. Worth to the L. A. office. This would eliminate type certification in Regions 4 and 7.

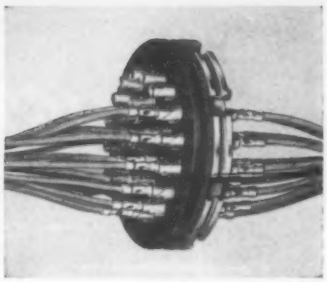
Labor Dept.

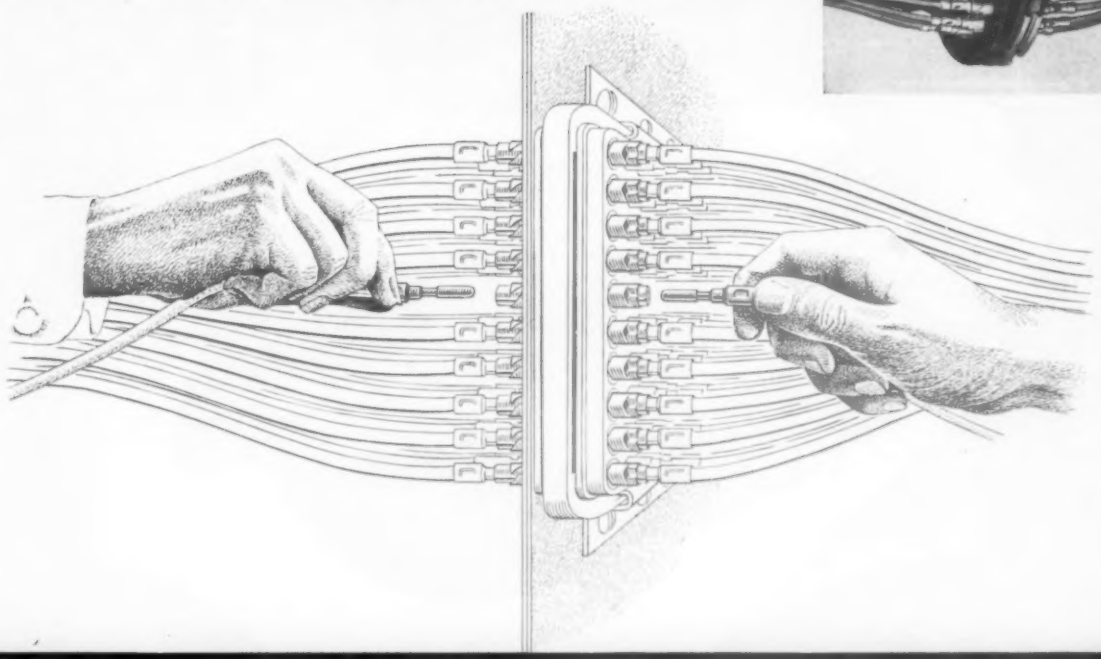
Labor added four jobs to its list of **critical occupations** for determining what Reservists & National Guards might or might not be properly called to active duty. They are: Airways operations specialist, multi-engine commercial airline pilot, aircraft assembly mechanic, and design draftsmen.

Industry

Fairchild is conducting a series of two-week **courses** for Kaiser-Frazer personnel in the intricacies of C-119 manufacture. Quality control functions relative to materials inspection, ordering, receipt, storage of materials and related technical inspection operations are covered.

for electrical connections through pressurized bulkheads





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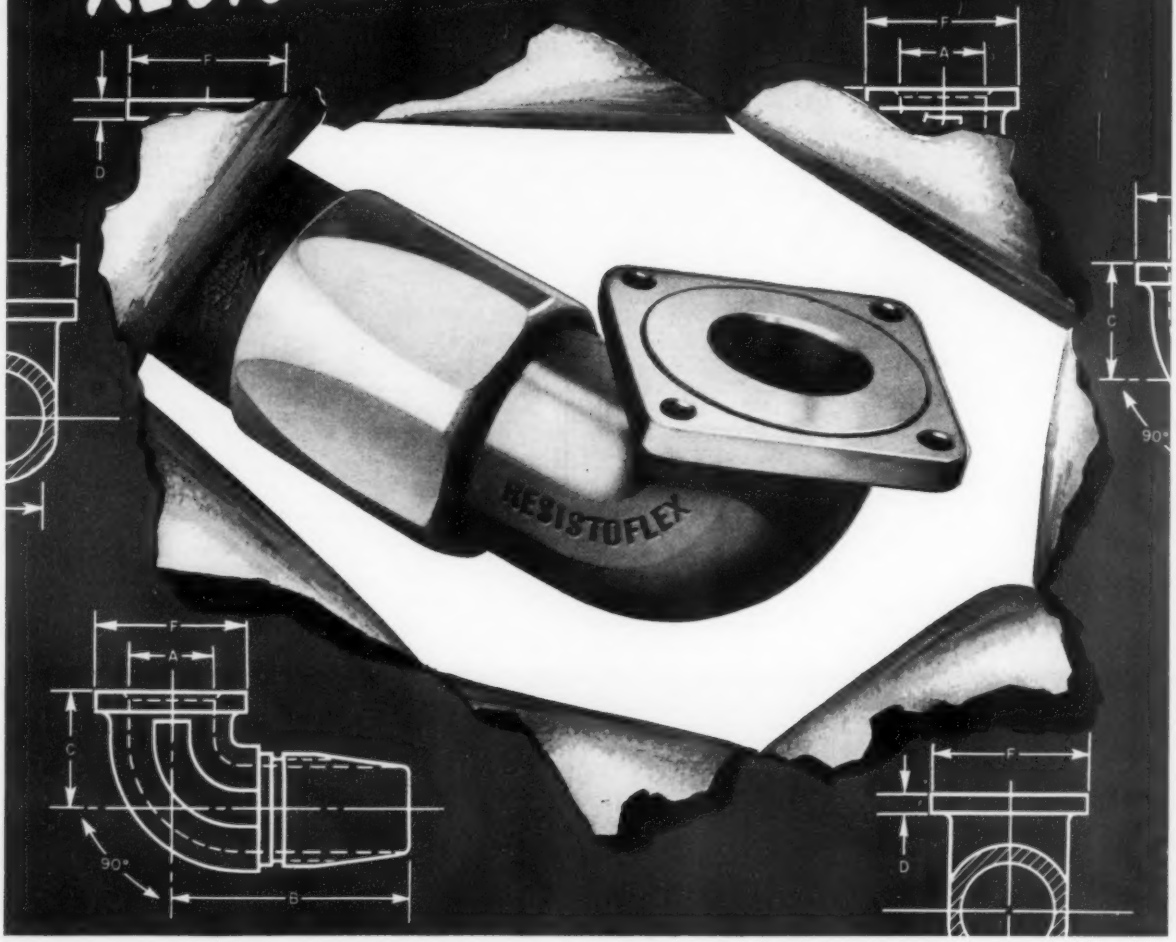
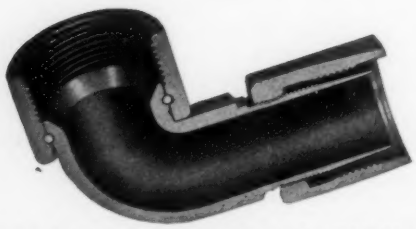


...with elbow swivel nut and flanged

FORGED ALUMINUM

hose fittings



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Props vs. Jets: Some More Navy Views

The use of jets for close air support was the subject of a letter exchange in AVIATION WEEK *Jan. 29 between a Navy commander and Alpheus W. Jessup, McGraw-Hill World News correspondent in the Far East. The commander was not too happy with the jets as a close-support weapon. This article gives some other Navy views.*

By Alpheus W. Jessup
(McGraw Hill World News)

Tokyo—It's not generally known that a big controversy exists among Navy airmen about aircraft development, especially aircraft for the task of close support for the infantry. The admirals and the captains continually stress the smartness of the Navy in sticking with propeller-driven aircraft. They like to "remind" correspondents how brilliant the Navy was in adopting the AD Skyraider and how dumb the Air Force was in not adopting the AD.

▶ **From the Ranks**—But a much different story is bottled up in the Navy. Their jet pilots, whose youth and lesser rank precludes their having a voice in high Navy policy, have much different ideas. Without revealing names because "we would be seamen second class the day after tomorrow," I quote from my conversations with and letters from Navy jet pilots who flew and are flying in Korea:

"We are firm believers in the jet for close support, so far as it is the best aircraft for the job. We have reservations when using it with present tactical air control methods. The jet is the aircraft no doubt, but using it with present control methods is like substituting a Buick clutch in a Model A Ford.

"Let's take it from the pilot's viewpoint, after all he's the one who will get chewed if he plummers up the detail:

"First, he has speed in a jet. He can take off and be on station soon after the initial call for help.

"Second, he has the stablest rocket and bombing platform. It's far superior to propeller-driven craft. The increased speed sharply reduces the lead or correction the pilot must apply to put his load on the target. Speed also decreases the time gravity can act on rockets and bombs, thus reducing trail. There is a slight disadvantage in strafing with machine guns in a jet, for the speed cuts down the time he can fire. But this may be offset by having all the guns in the nose making it easier to get on the target with the first burst.

"Third, he has a much better chance of getting home safely. Once he's dropped his load on the enemy, the jet pilot is a fighter again and a hell of a lot better off than a prop jockey. A propeller plane is meat on the table for an enemy jet.

"Fourth, he can get home and reload with a completely different type of armament in one-third the time required by a prop plane. This is an important factor for carriers which have limited numbers of aircraft aboard."

▶ **The Other Side**—"These are just a few of the more important advantages of the jet. There are disadvantages; but the disadvantages can be overcome by improving tactical control and target identification. The solution is not the adoption of aircraft to procedures, i.e. ditching the jet for the prop. It's surely the adapting of procedures to the aircraft which can do the job best—the jet.

"Communications is an old problem. Usually there are thirty-five chattering baboons on every VHF channel. The poor guy in the pet arrives over the target area, but, because he can't get a transmission in edgewise, he sits there picking his nose until fuel expenditure demands that he return home. As luck would have it, there's a new 180-channel VHF set coming soon which should solve this problem, giving darn near every pilot his private channel.

"Another communications problem deals with the alerting and launching of missions. This must be worked out with the ground forces, so we don't want to stick our fingers in that pie. But there's need for much improvement.

Locating the target is the biggest factor in doing a quick effective job. The jet speed makes pilot's location and identification of targets difficult. This can be overcome by more efficient methods of target making and identification. It is not being done now. More air support hops suffer negative results due to pilots not locating targets than for any other reason. Jets do a fine job in Korea, but they could do a much better job if the control was what it should be."

▶ **Some Solutions**—"What's needed? Better maps of convenient sizes. Now the pilot has a large map to unfold in the cockpit, and its about as easy as opening an umbrella in a phone booth. He should know the approximate location and description of his target before he takes off. Designation should include both grid coordinates and prominent landmarks. Once into the target area on close support, our hero should be put on the target immediately by our tactical air control party. With adequate communications they should take him onto a target the moment he enters the area. Some positive marking system is required to identify close support targets in the front lines like pill boxes. Flares, mortar and artillery shells could do the trick, but we need quicker, surer method than used so far. Otherwise lots of our heroes will dump their loads on small houses with crescents ingraved on the doors.

"Another point against present target identifications: this habit of circling for 30 to 40 minutes trying to find a pill box is going to get a lot of pilots killed if the enemy has any fighters in the air.

"The desired end result of an air support mission is an effectively delivered attack by aircraft on a ground target. In an effective attack:

- **Target must be destroyed** or rendered useless.
- **Job must be done** in a minimum amount of time.
- **Mission must be accomplished** with the least hazard to friendly aircraft and troops in the areas.
- **Maximum use must be made** of the aircraft while airborne.

"We have proven the jet can best meet the first two requirements. The last two are deliverable in direct ratio to the efficiency of the tactical control system. All present methods are outmoded and need a lot of improvement before the jets can do their very best in close support.

"So far we have been adapting a new weapon to old techniques. We should be developing new, or modifying old, techniques to serve the new and better weapon."

Wright Speeds Sapphire to Production

New Detroit engineering-manufacturing office is key to get-ready phase.

By Irving Stone

Wright Aeronautical Corp. isn't doing much talking to dispel the impression in some quarters that it is crawling into the jet production race.

Instead, it is depending on intense action now, content to let the words write themselves later.

▶ **Late Start, Quick Action**—Years after other powerplant fabricators here began pushing out their jets, WAC announced—on Oct. 6, 1950—their manufacturing agreement with Britain's Armstrong Siddeley for production of the 7220-lb.-thrust Sapphire. (Air Force designation for this jet will be the J-65.)

Two months later the engine was running in the Wood-Ridge, N. J., test block. And a swift swing to preparation for jet production was inaugurated simultaneously under the direction of WAC's manufacturing-engineering planners.

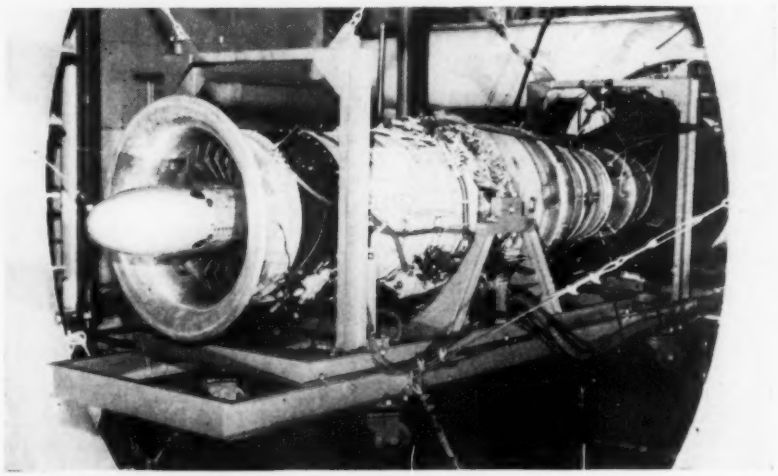
▶ **Coordinating Agency**—Key unit in readying the jet lines is WAC's Detroit manufacturing-engineering branch. Its job is to telescope and accelerate the preparational phase. Its personnel, purely supervisory, number only about 20 but these comprise a top-skill group headed by a master mechanic and his two assistants—one a production methods specialist, the other a tool design specialist.

And the complement includes a purchasing man, gaging expert, metallurgy consultant, etc., down to accountants.

The Detroit location was chosen because of the sources of tool supplies in the general vicinity, and one of the main jobs of the branch is to coordinate the work of production-engineering firms in the area.

These companies have written the several hundred operation sheets for fabrication of the Sapphire, involving about 1700 parts. These sheets detail the methods for making the various components and list all the tools required for the processes.

▶ **Wood-Ridge Benefits**—This arrangement was followed because there was not enough engineering talent releasable at WAC's Wood-Ridge plant, or available in the immediate vicinity, to do this work in the period allotted by schedules. Estimates show that with the Detroit setup, the time will be reduced to one-third that required if the work were to be performed at the Wood-Ridge plant.



TESTING of the Sapphire proceeds at Wright. Dolly remains attached during tests.

And another dividend was that other Wood-Ridge projects were not slowed—particularly work on the R-3350-30W Turbo-Compound (previously known as the Turbo-Cyclone), the combination piston and turbine engine for Lockheed's P2V-4 and Super Connie, Martin P5M and Fairchild C-119C.

▶ **Agency to Continue**—The Detroit manufacturing engineering activity is slated to function indefinitely, not only for any Sapphire developments but also for all future WAC jet engines. It is solely a company agency and will not be associated with Buick in its preparation to build the Sapphire under license.

To the approximately 3000 machine tools now at Wood-Ridge for the basic piston engine production, about 1600 more are being acquired to incorporate the Sapphire program.

Their procurement is being handled through the Detroit agency and are being obtained, first, from the Air Force pool, and secondly, by purchase.

No actual shop labor has yet been hired for the Sapphire production. But supervisors are being assigned for the program.

▶ **Production This Summer**—Engineering draftsmen already are engaged in converting Sapphire parts drawings from English to American standards. About 12 British engineers have been brought over to assist them and some also work with the Detroit activity.

Actual production of the Sapphire will start early this summer. And schedules anticipate several hundred a month in '52.

▶ **Scheme for Intitial Units**—The first few Sapphires—perhaps five or ten—will incorporate some British-built parts, hence these initial production units will be built to British standards because WAC-fabricated parts will have to conform so that the engine will not have a "mongrel" makeup.

Following this opening phase, there will be a rapid production acceleration and shift to American standards. This will involve some changes, slightly altering the engine in design detail.

Meanwhile, development work to boost the power of the engine will be carried out. Any desirable changes that show up will be incorporated in the production engine if they are of a nature that does not require experimental proving.

Materials, too, will have to be changed because some of those now used in the engine are not obtainable in this country.

Tolerances are another consideration that will take some keen analysis. British tolerances are very restrictive. WAC is hoping to liberalize them as much as possible without compromising the engine's high performance.

How far this liberalization can be carried will ultimately be determined by simultaneous test-block runs of

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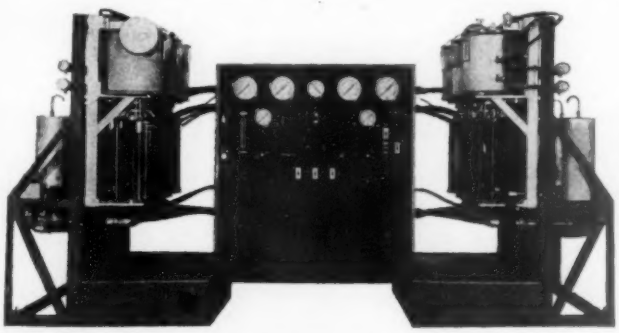

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ESSO EXPORT CORPORATION, AVIATION DEPARTMENT,
25 BROAD STREET, NEW YORK 4, N. Y.

a British Sapphire and its WAC-built counterpart.

▶**Cost Cuts Planned**—To reduce production costs, WAC probably will try to make at Wood-Ridge as many of those parts which, through feasibility of home-manufacture, could appreciably bring down the price of the engine. Even the fabrication of turbine blades will be a consideration.

But, in the main, it will place greatest reliance on production efficiency to cut costs. Emphasis will be put on trying to "de-skill" operations wherever possible, placing the accuracy in the machine instead of the operator.

Comparing what WAC expects to do with the Sapphire production-wise, with the British fabrication scheme for this engine, company officials believe that they can turn out the jet in half the time.

▶**Full Program Output**—Along with the Sapphire program, WAC also is concentrating on its Turbo-Compound engine. Production requirements for this engine next year for the Wood-Ridge plant alone should be about six times the present output.

And when the Sapphire program gets into full swing, its output plus that of the Turbo-Compound should result in the production of more units per month than at any time during World War II. In this latter period, about 750 Cyclone 18s per month came from Wood-Ridge.

▶**Plant Expansion**—As schedules for the Sapphire and Turbo-Compound now stand, there will be no need for erection of additional production facilities. This is because production-engineering and other activities are being moved into four new areas

▶**Employment Factors**—Overall employment figure for WAC is now about at the 11,000 mark. And another 7000 probably will be taken on before the year is over, and the figure undoubtedly will climb. Most of these probably will be shop personnel.

For design, development and research projects, WAC hasn't been able to hire all the engineers it could use. For all programs—including the Sapphire—it has taken on about 100 engineers since last fall, and this figure will jump as industrial mobilization accelerates, for all technical categories from drafting through fabrication to experimental test of components.

A vital sidelight on the tightness of the engineering personnel supply is that in five years the situation, for all aeronautical firms, may be more than just critical—perhaps appalling. Fewer engineers are reported coming out of schools because less have been entering, those with reserve commissions are being called into service, and Selective Service is taking others.

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Model IV 35 mm Cameras, as shown above, are used in parallel gangs of two or more cameras to photograph events at separated locations with exact frame-for-frame synchronization. Features include coding and timing lights, a rotary frame counter, precisely located fiducial markers for locating the optical frame center, change gears for multiple frame speeds up to 20 f.p.s., single framing operation, and precise alignment of the mounting pads with the optical axis for interchangeability on mounts. Each camera contains a built in synchronization control which prevents any camera of a gang from gaining or losing a frame in any sequence throughout the length of the film.

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Inquiries regarding applications, prices and deliveries will receive prompt attention. Our Bulletin 4-A describing these cameras will be sent upon request.

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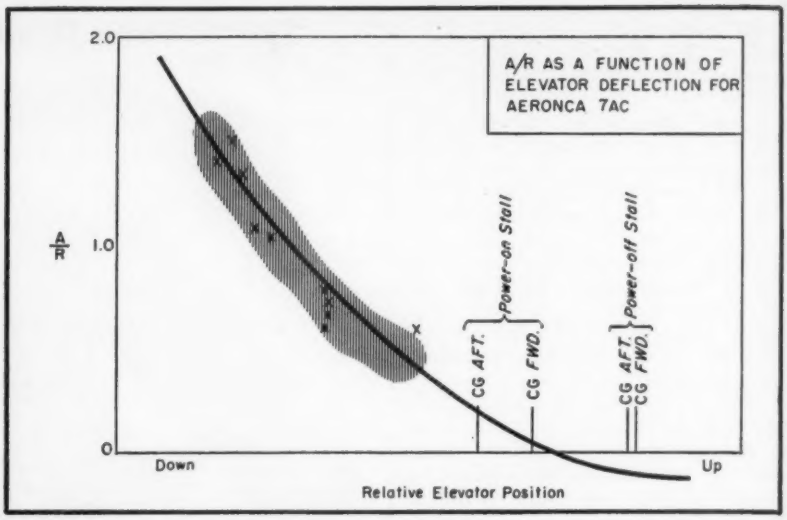

Single Curve Simplifies Control

New system, adaptable to all aircraft, uses mechanical computer based on theoretical calculations.

A simplified control system which promises to be applicable to large and small aircraft alike has been flight-tested by Dr. Frederick W. Ross, professor of aeronautical engineering at the University of Detroit. Ross' test installation in an Aeronca 7AC has logged more than 200 hr. of flight time, and has attracted considerable interest among Air Force personnel at Wright-Patterson AFB, Dayton.

Entire system is based on the single relation between the ratio of aileron to rudder deflection for a given elevator setting. Using flight test data from perfectly coordinated turns, Ross plotted a single curve which served as the theoretical basis for the development of his simplified system.

With this new system, all controls can be used to their full design deflections—there are no built-in stops—and full aerobatic flight can be performed.

► **Four Ways**—Flying an airplane with the conventional control system means that the pilot operates his controls in four basically different ways for each one of four flight regimes.

- **Normal flight,** where ailerons and rudder are coordinated.
- **Stalling flight,** where ailerons are held neutral and lateral control is obtained with the rudder.
- **Slipping flight,** where aileron and rudder are coordinated, but in reverse with respect to normal flight.
- **Spinning flight,** where ailerons are held neutral and opposite rudder and down elevator are applied.

Complete lateral control of the airplane can only be obtained by the aerodynamic intercoupling of control surfaces as outlined.

But this intercoupling is affected by many items including air speed, elevator, flap, trim tab and landing gear position and engine power setting. And further, design differences between airplanes alter the intercoupling; a pilot who climbs out of one type of craft and into another is well aware of this effect.

It is reasonable to expect that some of these design and configuration parameters will have more effect on the aerodynamic intercoupling than others will, and that some will have negligible effect. Working on this hypothesis, Dr. Ross analyzed the lateral turning problem and determined that the single most important parameter was the ratio of aileron deflection to rudder deflection for a correctly-banked turn.

► **Three Influences**—This required ratio, which Dr. Ross designates by the symbol A/R, is influenced mainly by air speed, elevator setting and angle of attack. But these three are interrelated, and so it may be stated that A/R is a function mainly of the elevator setting.

Flight test data were taken on an Aeronca Model 7AC to prove this statement. Corrdinated turns were made in smooth air by a pilot who was thoroughly familiar with the aircraft, and only data with no indication of slip or skid were used in the analysis.

Full range of power, air speed, angle of attack, flight weight, center of gravity, elevator trim tab and attitude were flown. Effect of these items, individually and collectively, lies within the shaded band on the graph above. The small crosses on the graph indicate

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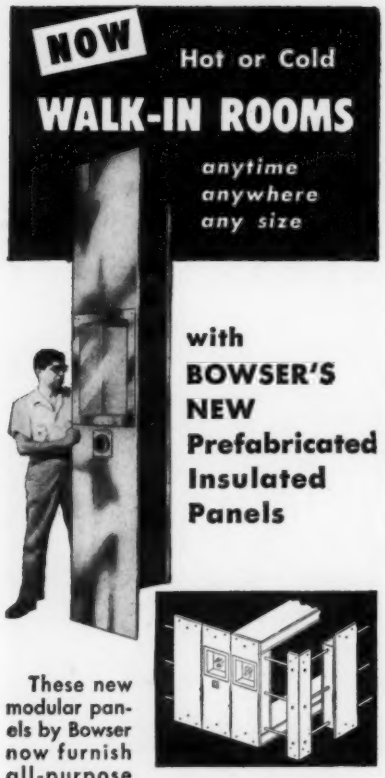

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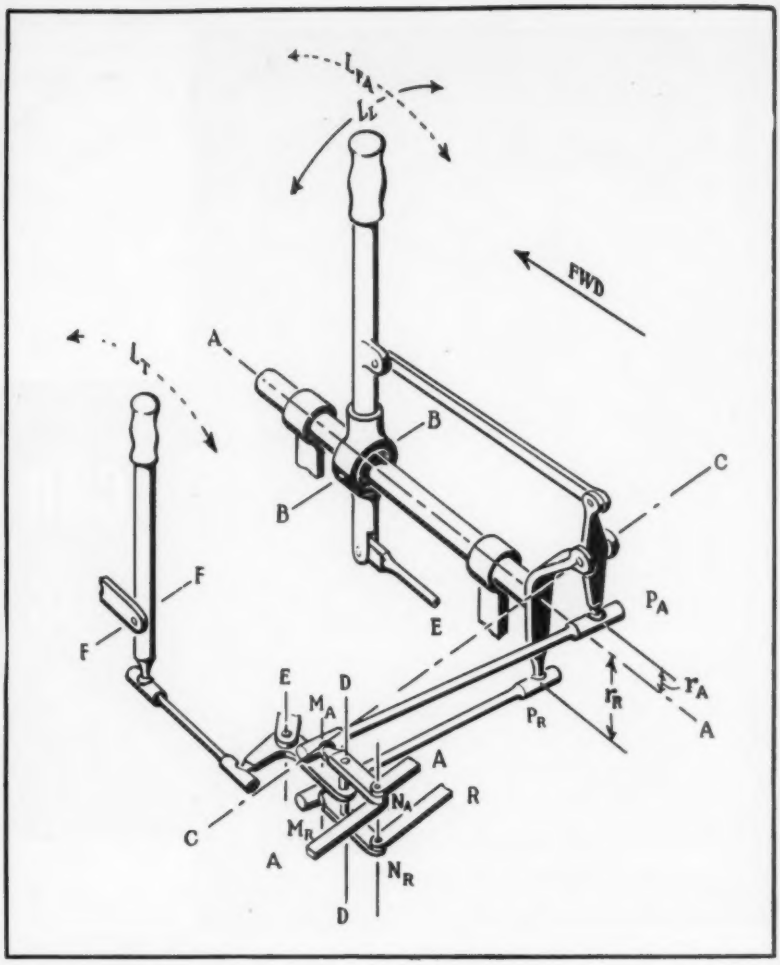

scatter from the faired A/R curve; the scatter points were plotted from test turns which were judged by competent pilots as being excellently coordinated.

The important fact then is that the secondary effect of all items other than elevator setting do not make the airplane behavior depart from the desired A/R curve enough to be judged as undesirable by a competent pilot.

From this it follows that any value of A/R within the shaded width will be accepted as an excellently coordinated turn.

▶ **Mechanical Computer**—The problem then is to make the control surfaces deflect in accordance with the A/R versus elevator deflection curve. Dr. Ross has chosen to do this with what might be termed a mechanical computer, a modified control linkage which replaces the standard system with a stick and a trim lever. Rudders and ailerons still are operated with lateral motion of the stick (or rotation of an equivalent wheel).

The above drawing of the system shows the operation of the controls and the computer linkage. Fore and aft motion of the controls works the elevators with rod E. Lateral motion brings into play the Ross system.

A collar in the lower portion of the stick is bolted (axis B-B) through a torque tube drive (axis A-A). Lateral motion of the stick rotates this torque tube.

Above the tube is a parallel shaft which also moves with lateral motion of the stick. This lever is hooked to a pinjoint lever functioning around the axis C-C. Moving the stick to the left, for example, moves the lever P sub A-M sub A to the left and actuates the ailerons. With the same motion, the bar P sub R - M sub R below the torque tube is also actuated, but toward the right. This motion operates the rudder control. Thus, these two levers are activated in unison by the stick, and move in opposite directions, thereby guiding the plane through a coordinated turn.

▶ **Linkage Lengths**—The lever lengths have been developed in accordance with the curve of A/R against elevator setting. When the stick is pulled all the way back, as for a full stall, the vertical linkage is such that the effect on the ailerons is reduced to zero. At high

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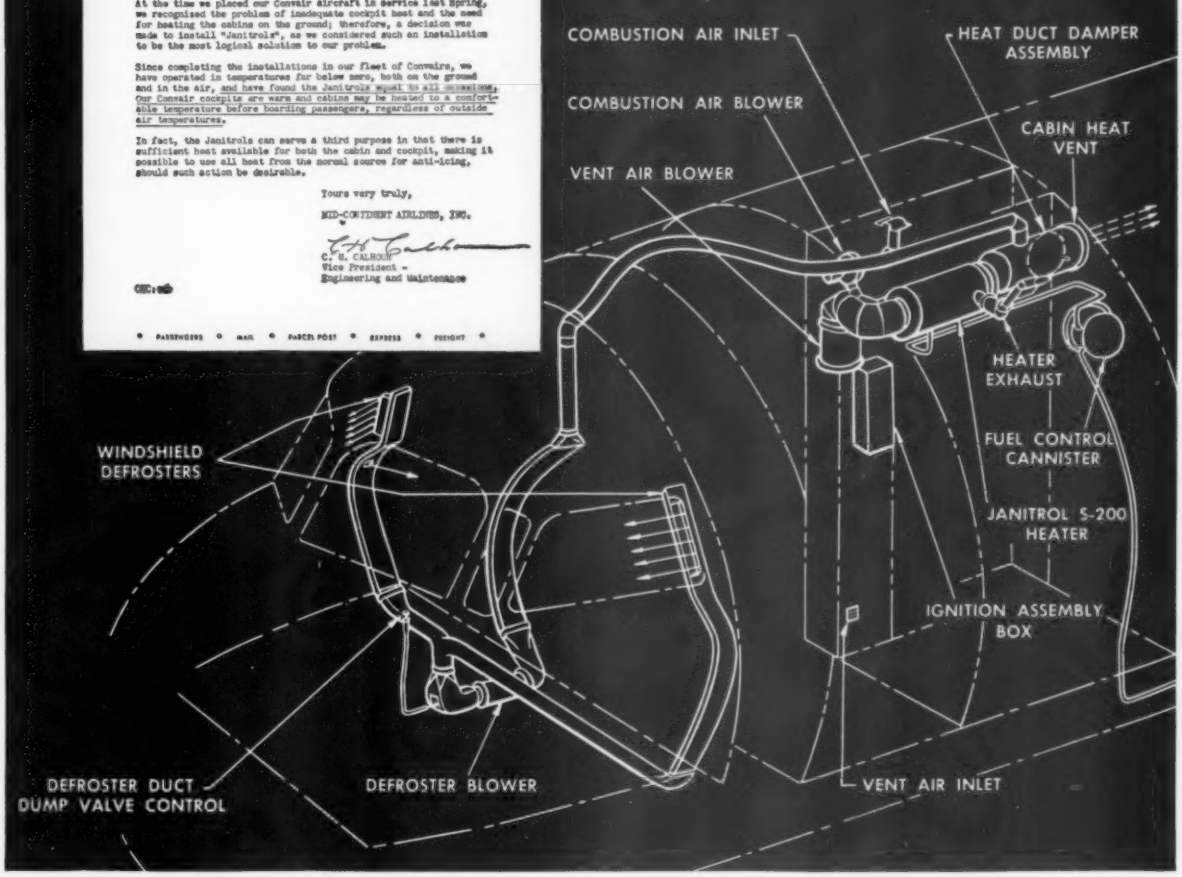

". . . and thanks from the pilots."

Re Janitrol heating equipment on Mid-Continent Convairs, Captain L. Homer Mouden wrote in his log book: "It is really a comfort and a joy to have heat in the cockpit. This is the best arrangement of our CV-240 fleet . . . and thanks from the pilots." Thanks to you, Mid-Continent, for a heart-warming testimonial.

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speeds, the major effect of lateral motion of the stick is on the ailerons only.

At the left of the diagram is the trim lever, whose fore-and-aft motion rotates a bell crank about axis E-E. This displaces axis D-D parallel to itself and changes the kinematics of the aileron-rudder linkage to permit cross-control operations.

This trim lever takes the place of aileron and rudder trim tabs as well as permitting the cross-control functions necessary for slipping.

► **System Advantages**—Dr. Ross summarizes the advantages of his simplified control system like this:

• **No restrictions** are imposed on the airplane—full aerobatic flight can be performed, and all controls used to their full deflections.

• **Simplified pilot technique** is possible.

• **Flight precision is improved.**

• **Reduced pilot fatigue** results from the ease of flying.

• **Training time is reduced.**

• **Lateral stability** is improved

On the Aeronca test aircraft, only a few additional rods were required to install the system. No service adjustment have been found necessary after a year of service comprising over 200 flights. The mechanism lends itself to package units for installation with little modification; in the Aeronca, for instance, only the floors boards were cut.

The system could also be applied to large planes, says Ross. Effects of weight and center-of-gravity changes and of trim tab position should produce no effects. Higher power, flaps and retractable landing gear should cause no specific trouble, but at the most would introduce changes in the relation between elevator setting and angle of attack. These could be handled by an extra bell crank and actuating linkage.

With compressibility effects, a small, almost insignificant change in the linkages could handle the reduction in aileron effectiveness at high speeds, according to Dr. Ross.

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Scientific Faith

The creative man has intelligence to use his work, says Smyth.

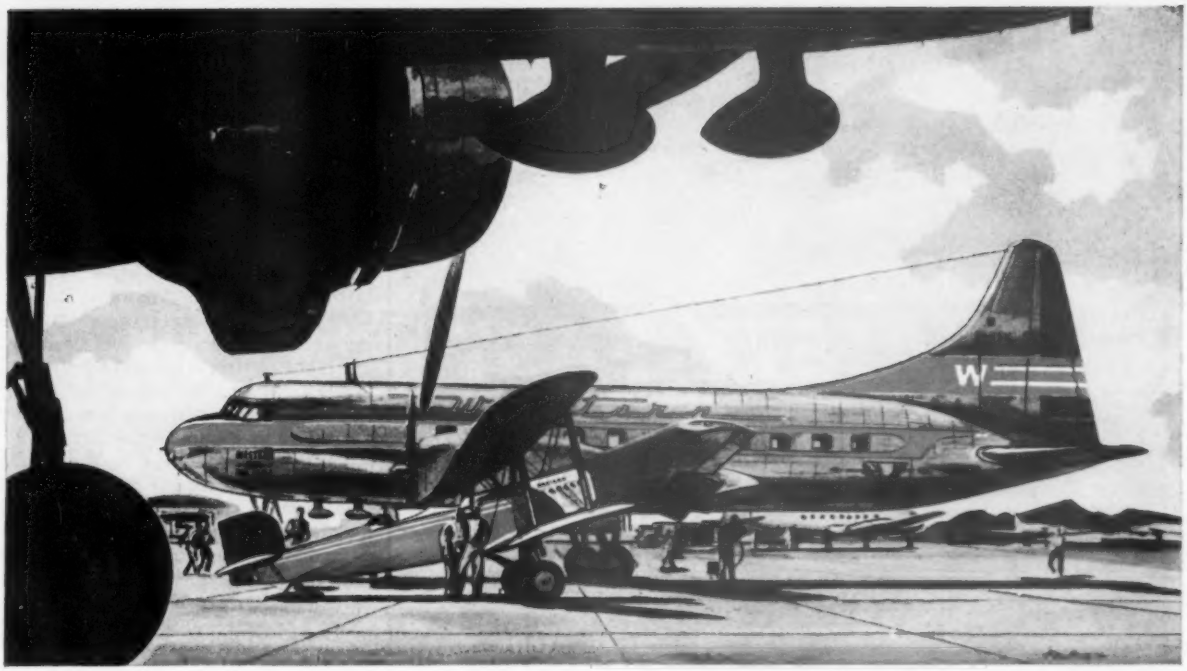
What it means to be a scientist in these times has been defined by Henry DeWolf Smyth much clearer and more interestingly than is usually the case with a man attempting to speak objectively of his own profession.

Smyth, a member of the Atomic Energy Commission and author of the famed Smyth report on atomic energy, recently spoke to the winners of the Westinghouse tenth annual science talent search.

Some of the thoughts voiced by Smyth seem well worth repeating; the excerpts presented here are from the text released by the AEC.

► **Change with Time**—"Fifty or a hundred years ago, most machines and processes came from simple inventions. They were developed by men working for a specific objective without very much knowledge of the general laws of nature. . . . These men were inventors and not scientists. . . . Some useful machines continue to be made by inventors of this type, but by and large the growing importance of chemical and electrical processes and the great complexity of even our mechanical machinery today have forced our technology to depend more and more on engineers and scientists who have had a thorough grounding in the natural sciences. . . . So-called "useless" research has turned out to be often extremely useful research. . . . We must continue to support basic scientific research, for if we do not have further discoveries in basic science today, we shall have no developments in technology tomorrow.

". . . It is even more important at the moment for us to encourage basic science than it was before the war. . . . Today we have no backlog of basic

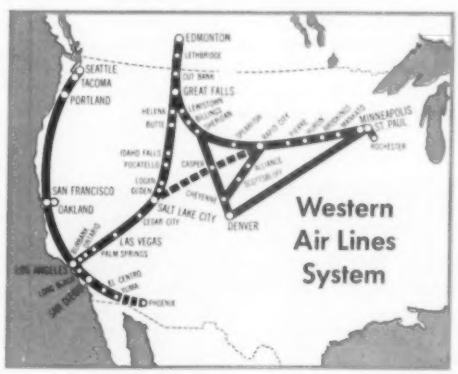


As America's Oldest Airline begins its second quarter-century...

In April, Western Air Lines becomes the first airline in the nation to complete 25 years of continuous operation. Air transport's growth during this quarter-century has speeded the development of the West by setting new standards of travel and communication.

Western is proud to have pioneered from its original route between Los Angeles and Salt Lake City, started in 1926 with two-passenger, open cockpit biplanes, to its present 5000-mile system, serving each day with modern, dependable airplanes, 45 cities in 13 western states and Canada.

Western is proud to have developed new equipment and techniques that have been adopted by the industry; proud that in addition to meeting the needs of commerce and of the postal service, its record shows many jobs well done for the military during World War II — including the operation for over three years of a vital route between Montana and Alaska. Today some of Western's personnel and aircraft are engaged under Air Force contract in the Pacific Airlift from California to Tokyo.



On its Silver Anniversary, Western pledges its continued effort to strengthen the nation's air transport facilities—for peace, mobilization or war.

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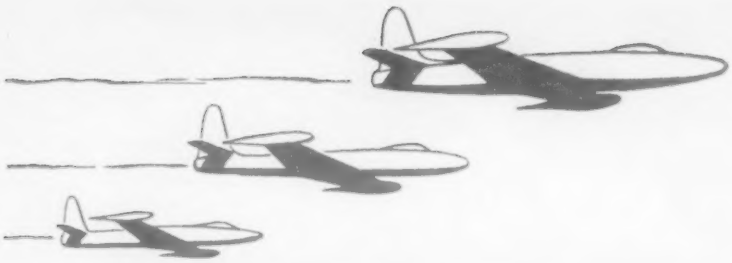
25 years of progress by America's scheduled airlines is reflected in the contrast between Western's modern airliners and the little M-2 biplane that made Western's first flight on April 17, 1926. In continuous operation since that day, Western is America's Oldest Airline.



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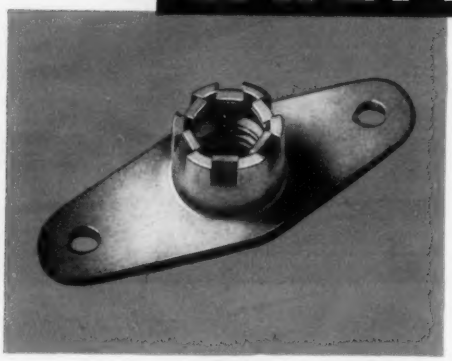

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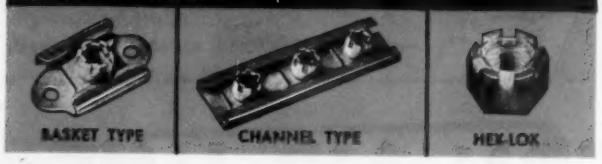

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science from which to draw new technological developments. What we are developing in technology today depends on the basic research of the nineteen thirties.

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▶ **Science and Service**—"In the period ahead of us, no citizen can be deferred from national service in this sense (of long-range value to the country of his particular task). A young man using his skill in a laboratory may well be of more value . . . than if he were in uniform. The wise use of manpower must be our first concern.

". . . There are certain conditions that a scientist in this country must expect to find in the next ten or 20 years. I can assure him . . . that he will not be wealthy. . . . A scientist must also be expected to be considered a little peculiar because he obviously likes to think. His habit of questioning everything . . . and of being willing to try new ways . . . will probably bring down on his head the dark suspicion that he is a radical. . . . Scientists are often called naive in public affairs, but I think it would be more accurate to call them incurably optimistic. . . . Experience has taught them that men working together in a spirit of mutual tolerance and cooperation can achieve miracles. . . .

"Our constant effort must be to limit secrecy to those areas where it is necessary for national safety and to remove it as quickly as we can from all other areas.

▶ **Science and Loyalty**—". . . No country is stronger than the integrity of its individual citizens. . . . Thousands of American scientists have had and still have access to secret information upon which the safety of this country depends, and . . . fully understand the nature of this public trust. . . . No possible excuse can exist for a man to break his word of honor. If he does not believe in the objectives of the society for which he works, he is free to criticize those objectives, but he is never free to betray them. Criticism is a very different thing from betrayal. . . .

"There are many thoughtful men who are frightened by the developments of modern science. . . . I believe that if men are intelligent enough to create

First to harness dynamic turboprop power!

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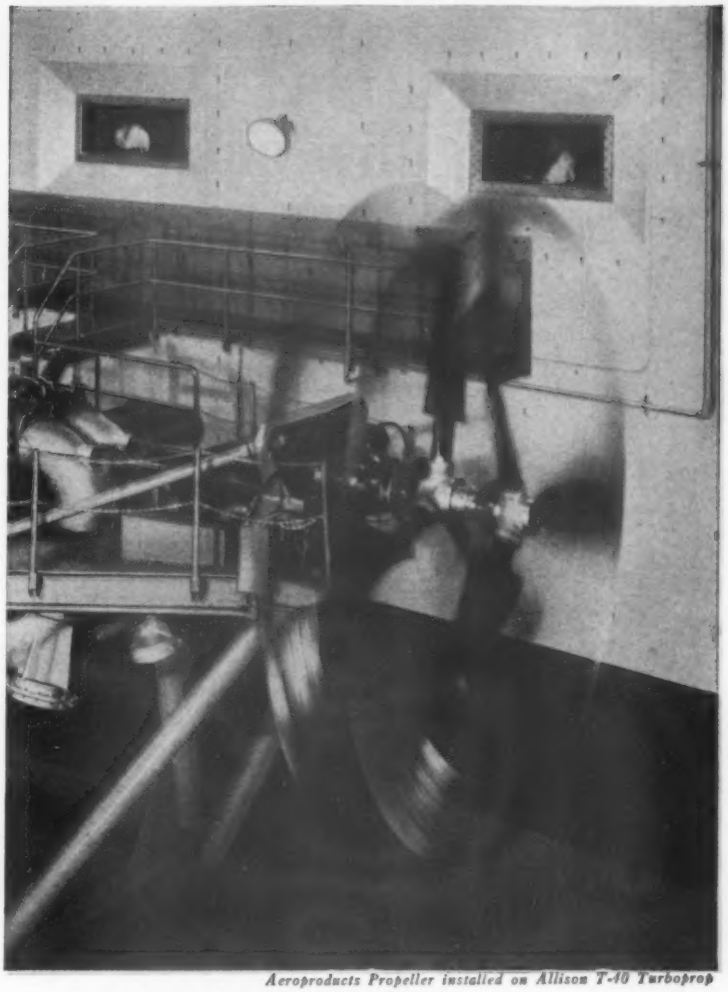

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A new day has dawned in the history of flight—the day of turboprop power!

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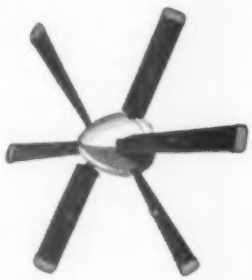

December, 1945—a dramatic milestone in the development of turboprop power! For it was then that the Convair F-81 was flown, first Air Force fighter using turboprop power. And from these tests came knowledge for the development of Aeroprops for new planes that utilize the full power, the enormous thrust of the turboprop engine and Aeroprop combination—and set wonderful new standards of aircraft performance.

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mathematical formulas, airplanes, radios and atomic weapons, they are also intelligent enough to learn how to live together. I believe we will achieve this, and not be destroyed by the tools we have made. . . .

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Extensive Tests on British Delta Wings

The British are racking up lots of test time in the fleet of three delta-winged research aircraft currently flying—Avro's 707B, Boulton Paul's P.111 and Fairey's F.D.1.

The test flights are supplementing intensive windtunnel testing of triangular planform wings. And the pilots are convinced that there are no aerodynamic difficulties inherent in the design.

Primary reason for choosing the delta layout is to prove flight behavior of such aircraft at transonic and low supersonic speeds where they show advantages over other design forms. With this comes a secondary advantage, in that the wing volume becomes a very useful container for fuel, armament, bombs and—in larger aircraft—the crew and engines. (It might be added here that this argument is shot if a thin wing is used, as in Convair's XF-92 in this country.)

The three British deltas now flying are fitted with elevons—elevator and aileron combination—for control in pitch and roll, and a standard rudder arrangement for yaw. The F.D.1 has a small horizontal tail and fixed wingtip slots which are to be removed after early test flights.

All three planes carry parachutes for emergency use, such as spin recovery or for extra drag in landing.

The Boulton Paul P.111 has removable wingtips and fintips so that the effect of "clipped wings" can be studied on that aircraft. (Reason for this seems obscure. Wings are usually clipped to improve rate of roll, a commodity with which each delta-winged aircraft is very well supplied.)

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Strange Design

The French, who in their time have produced some weird-looking planes, seem to have outdone themselves with their latest ground-attack job, the SE 2410 Grognard.

But first impressions are often misleading, and a study of pictures of the Grognard shows that all the bulges and lumps are there for a purpose, and that the overall design is an ingenious one.

▶ **Some History**—Grognard is not a new aircraft; it was first publicly exhibited as a windtunnel model at the Paris air show in 1949. First flight was made in April 1950.

The SE 2410 is, as the designation implies, a product of the French nationalized aircraft factory S. N. C. A. du Sud-Est. Designer was M. Satre, chief engineer of the Toulouse works of SNCASE.

Basically, the design of Grognard features a mid-mounted, sweptback wing, and a low-mounted, sweptback horizontal tail. Gross weight is about 43,000 lb. Power comes from a unique installation of two Hispano-Suiza-built Rolls-Royce Nene turbojets, mounted one above the other in the manner of an over-and-under shotgun. This powerplant arrangement is responsible for the lines of the fuselage.

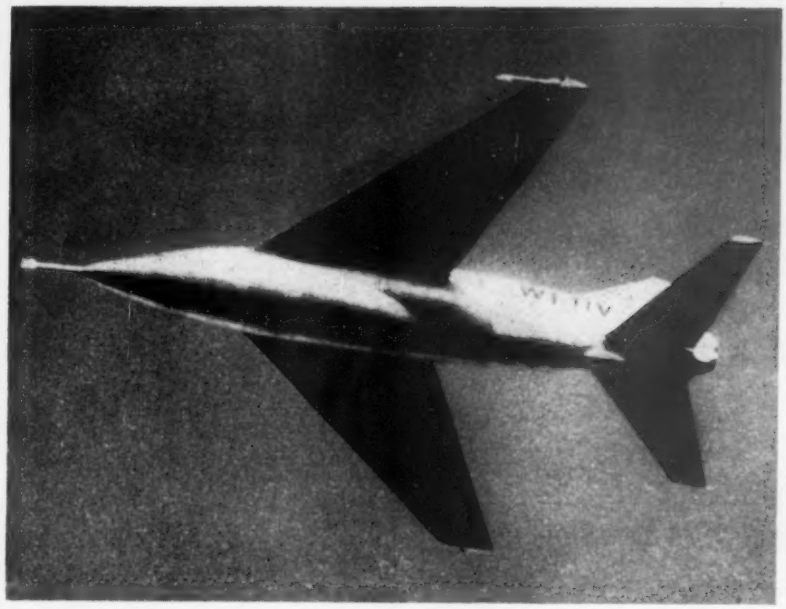
Pilot of the SE 2410 sits very far forward in the fuselage nose; his visibility is unexcelled. After an abrupt windshield rise, the fuselage upper line dips down a bit and then swells rapidly around a single air intake which serves both jet engines. (Such an intake location is generally susceptible to local stalling and poor pressure recovery at high angles of attack; but it has been reported that windtunnel tests at Chalais-Meudon showed neither of these characteristics.)

▶ **Triangular Tail**—Upper fuselage line runs aft from the intake and fairs down into the upper jet orifice; but the fuselage appearance is marred by a high-perched vertical tail. This surface is made up of a triangular fin and nearly rectangular rudder, so that the overall appearance of the tail is that of a draftsman's triangle with one point broken off.

A bumper mounting a small tail wheel is located at the aft underside of the fuselage, and it fairs up into the root of the horizontal tail. In these days of high-mounted horizontal control surfaces, it comes as a surprise to see one mounted so low, and so obviously in the wing wake. The horizontal tail has variable incidence; the pictures emphasize this feature.

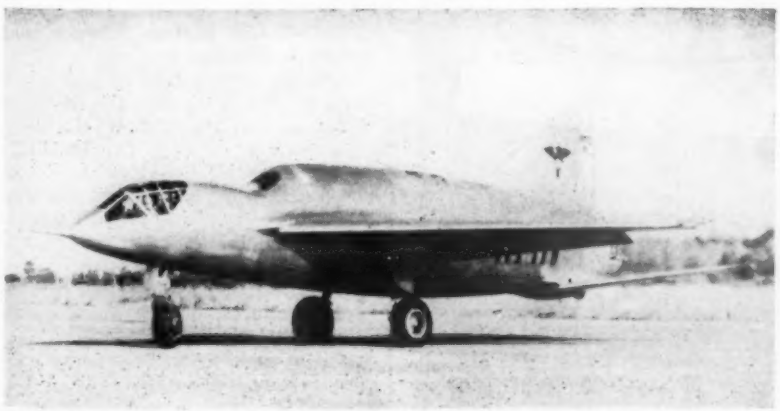
▶ **Wing Layout**—Taper ratio of the wing is about 4:1 from theoretical root

French SE 2410 Grognard

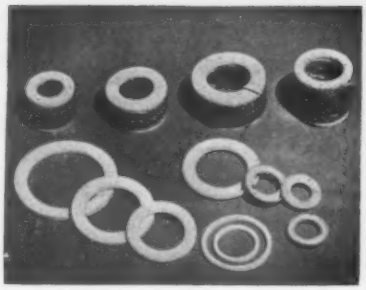


IN THE AIR, Grognard shows its sweptback surfaces and low-mounted tail to advantage.

LANDING configuration of the SE 2410 emphasizes large-span flaps, droop-snoot wing.



HOODED COBRA: Grognard's nose and engine air intake create a reptilian impression.



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to actual tip. The inner 70 percent or so of the wing panels is fitted with flaps; ailerons appear small. Entire leading edge of the wing droops for landing.

The Grognard has tricycle landing gear, with nose and main wheels of almost the same dimensions. All three units retract into the fuselage, a design solution which means a narrow tread for the main wheels.

An anti-spin parachute is mounted in the tail, and this chute—of the ribbon type developed by the Germans—can also be used to reduce the length of the landing run.

Another unique design feature of the Grognard is the pilot's control setup. The conventional central column is replaced by two handgrips mounted on armrests, one on each side of the pilot's seat. The grips have the same degrees of motion as the usual stick arrangement, and are interconnected so that the pilot can fly with one hand.

Such a layout gives the pilot a better view of the instrument panel, and allows installation, on the grips, of more buttons and switches than can usually be mounted. It would also seem that it might be less fatiguing to fly this way.

▶ **Future Developments**—The first prototype of the SE 2410 is unarmed, and was built primarily to test the design. A two-seat version, the SE 2415, first flew on Feb. 14; it differs in the nose and cockpit section, which has been lengthened. The lines have been changed at the expense of pilot field-of-vision; the new cockpit is a semi-bubble type.

An all-weather fighter version, SE 2421, is also under development.

NACA Reports

▶ **The Use of an Uncalibrated Cone for Determination of Flow Angles and Mach numbers at Supersonic Speeds (TN-2190)—by Morton Cooper and Robert A. Webster.**

Another contribution to high-speed flight research is found in the results of a pressure-distribution study of a body of revolution, made in Langley Lab's 4x4-ft. supersonic tunnel at Mach 1.59 and Reynolds number of 1.04×10^6 per foot.

Data for the forward part of the body indicate the accuracy with which an uncalibrated cone with four static-pressure orifices and one total-pressure orifice can be used as a Mach number and flow angle indicator at supersonic speeds. Results show that with simple averaging process, the free-stream Mach number for these tests could be pre-

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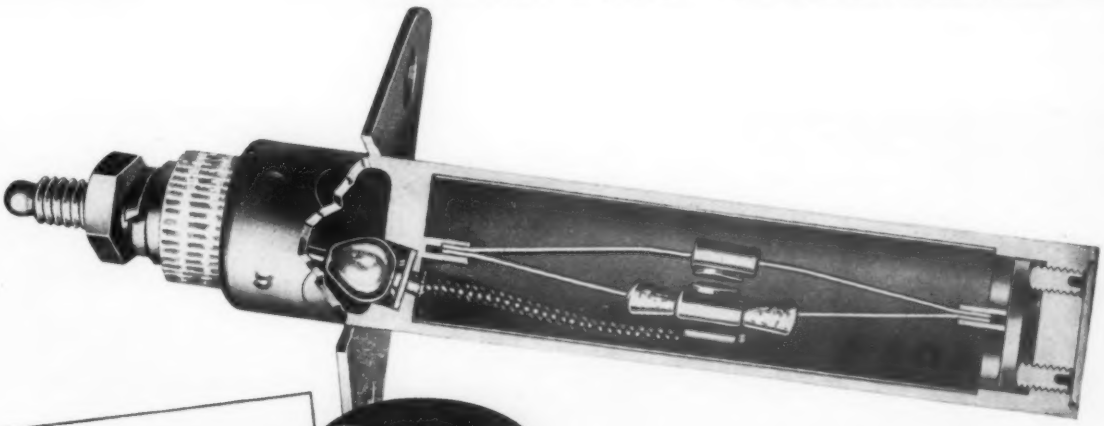

THROUGH PROPER SELECTION of alloy metals of shell and strut assembly Fenwal engineers design dynamic fire and over-heat detection for specific aircraft needs. The shell is the temperature-sensitive, activating element. Units comply well within CAA Technical Standard Order C-11 in accordance with the SAE, specifications AS-401.

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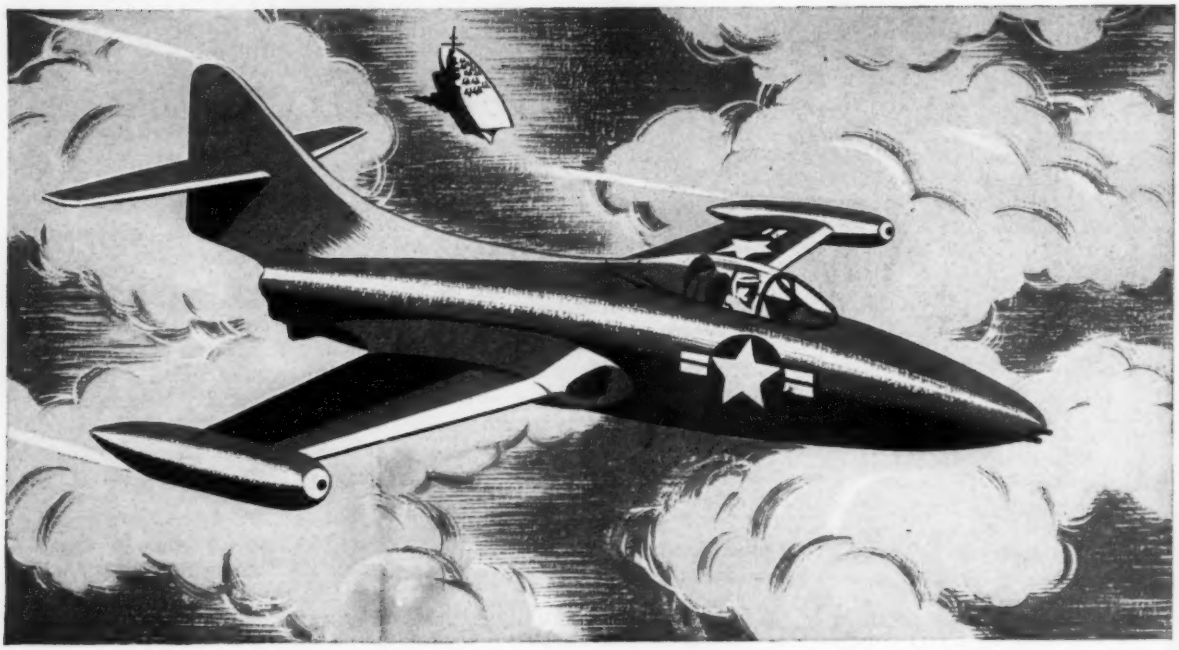

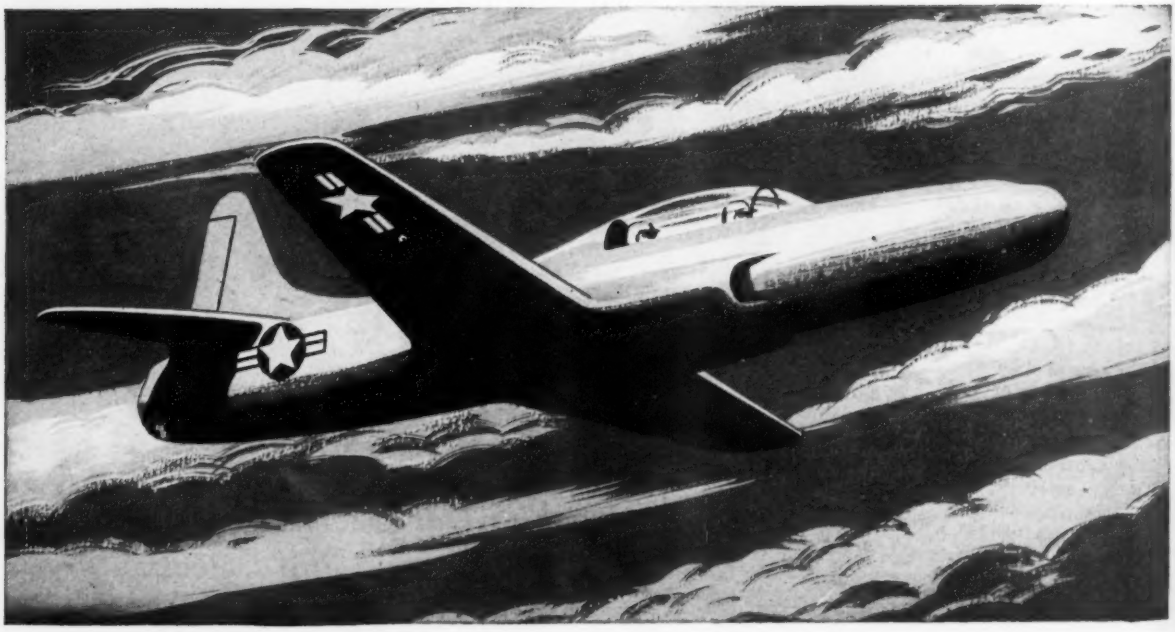

With J-48 Turbo-Wasp Engines Prove Once Again That

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PICTURED HERE are two of the nation's top fighters—the Navy Grumman F9F-5 Panther and the Air Force's Lockheed F94-C. Each of these single-engined airplanes develops more power than any four-engined bomber of World War II . . . thanks to the J-48 Pratt & Whitney Turbo-Wasp, the most powerful jet engine in production in America today.

THE OUTSTANDING PERFORMANCE of this power plant wasn't easily achieved.

IT ALL BEGAN in May 1947 when Pratt & Whitney Aircraft obtained a license to build its own version of the Rolls-Royce Nene engine. Americanized—produced entirely from American sources of material and further developed—this engine, the J-42 Turbo-Wasp, was in production late in 1948.

ONE YEAR LATER, the first experimental model of its successor, the more powerful J-48, was ready for flight test. Ahead still lay a long and difficult program of development, test and refinement—not only of the complete engine but of individual parts and sub-assemblies.

ONLY IN THIS WAY was Pratt & Whitney able to build into the J-48 the same dependability and high performance that marked Pratt & Whitney piston engines which furnished more than half the power of U. S. air strength during World War II.

LATE IN 1950, the first production J-48 engines were delivered to the Armed Forces—and today their high power output is being reflected in the outstanding performance of these Navy and Air Force jet fighters. To meet heavy demands from the Armed Forces for these engines, Pratt & Whitney Aircraft is now rapidly stepping up its own production and has also licensed the Dodge Division of the Chrysler Corporation to build additional quantities. Meanwhile, Pratt & Whitney is continuing to develop and further refine the J-48 Turbo-Wasp to help assure air supremacy for this nation.

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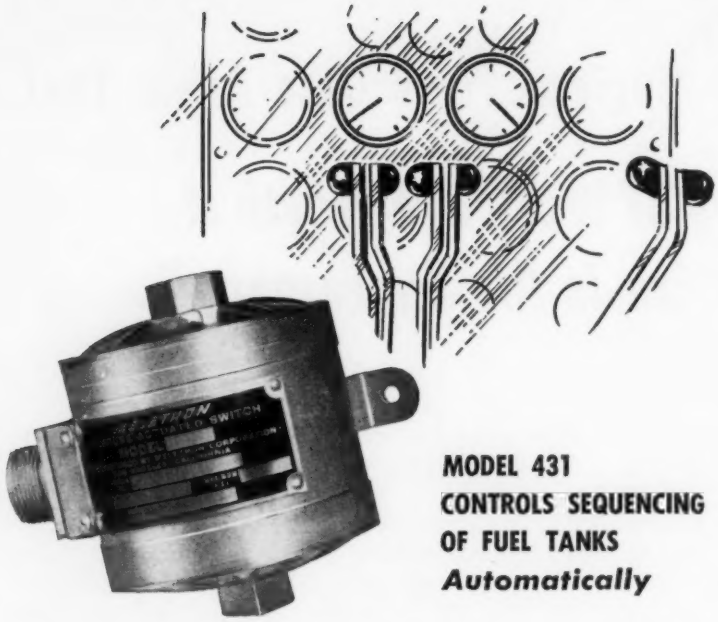

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dicted within .01 up to incidence angles of about 8 deg. Further increases in incidence gave an overestimation of Mach number by as much as .05 at an angle of 16.10 deg.

Angles of attack and yaw were predicted within 0.5 deg. for various combinations of pitch and yaw up to 10-deg. angle of attack. In an installation where yaw was zero, angle of attack prediction was improved to within 0.3 deg. in the angle of attack range from 6-14 deg. by proper orientation of static orifices.

Comparison of the experimental pressure distributions over the surface of the cone with various theoretical calculations indicated marked superiority of the theoretical calculations in which the presence of entropy singularity on the upper surface of the cone was considered.

►Comparative Drag Measurements at Transonic Speeds of Rectangular and Sweptback NACA 65-009 Airfoils Mounted on a Freely Falling Body (Report 988)—Charles W. Mathews and Jim Rogers Thompson, Langley Aeronautical Lab.

Five years ago, NACA was conducting an extensive program to determine the general characteristics of sweptback surfaces; part of this investigation centered around drop tests of a body-wing combination.

Originally classified, the results of that investigation have just been released as Report 988.

Two airfoils were compared: a rectangular planform and a sweptback planform of equal span and frontal area. Both were of NACA 65-009 section of equal chord measured perpendicular to the leading edge. Sweep was 45 deg.

Final results are presented as three curves: drag coefficient based on plan area, drag coefficient based on frontal area and drag parameter (Drag in lb. divided by the product of frontal area and static pressure).

The curves show that the drag of the sweptback plan form is less than 0.3 that of the rectangular plan form at a Mach number of 1.0, and less than 0.4 at a Mach number of 1.2.

Comparison of drag curves for the sweptback and rectangular wing show the difference in rate of drag increase with Mach number. The rectangular wing shows the characteristic sharp rise at transonic speeds and the gradual rise once over the hump; this compares to the sweptback wing which shows a nearly linear increase with Mach number.

It should be noted that uncertainties for the actual value of the drag coefficient are almost 60 percent at a Mach number of 0.9, and decrease to the much-improved value of 10 percent at Mach number of 1.2.

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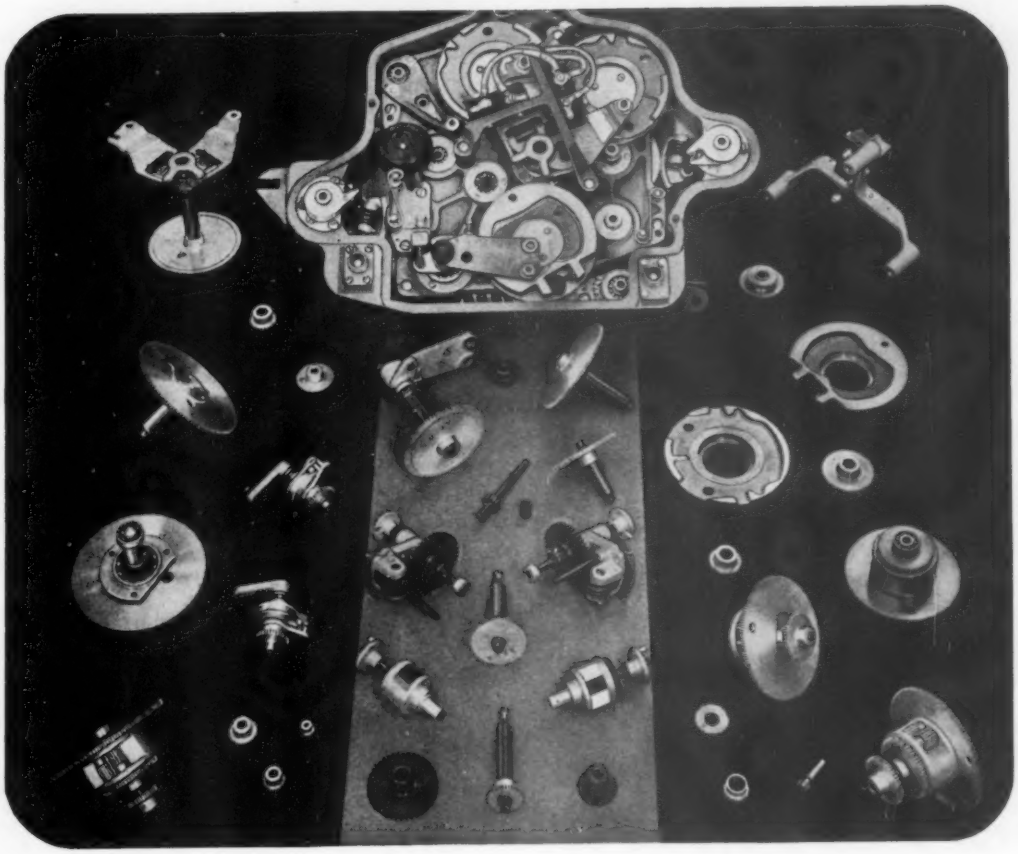

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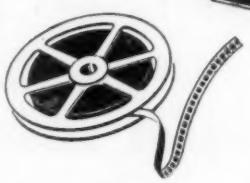

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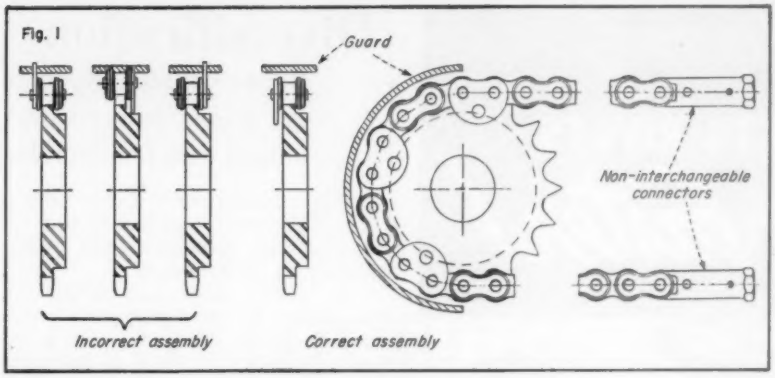
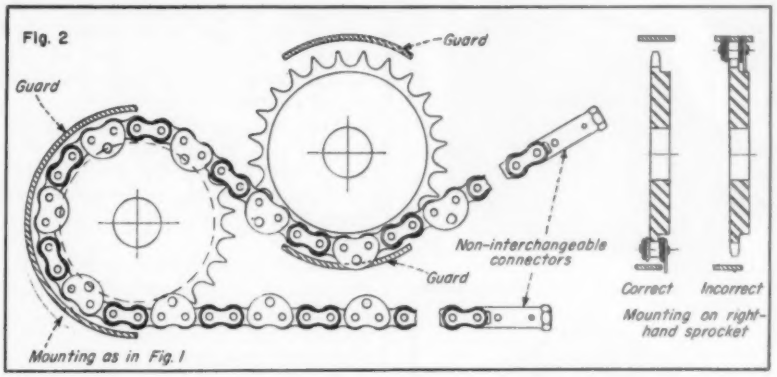




Chain You Can't Hook Up Wrong

Modification of a standard design suitable for control system connections, will be patent-free.

A new roller chain and sprocket arrangement has been developed to overcome wrong hookups in aircraft control systems using this type of equipment.

In those hookups which are a combination of cable and chain there is a possibility of confusion in the connection of chain to cable and chain to sprocket.

For correct connection between chain and cable, non-interchangeable connectors can be used, but the chain to wheel hookup presents more possibility of error.

▶**Extension Plate Feature**—Renold and Coventry Chain Co., Ltd., Manchester, England, has announced a modification of a standard chain design to eliminate chance of error resulting in reversed controls. Details are shown in the accompanying illustrations.

The chain is fitted with outer plates arranged on one side at four-pitch intervals. The plates are extended (bulged) in one direction and have lightening holes. Reversal of the correct relative position of the chain on the sprocket end to end is prevented by using a boss on one side of the sprocket and the guard which also serves to keep the chain from riding the sprocket.

▶**Only One Way**—A standard chain could be accommodated in four different positions on the sprocket because of its ability to mesh on two faces and reversibility end to end.

But with this chain and sprocket design, coupled with the guard (Fig. 1), only one position is possible. With this arrangement, only the correct hookup can be made.

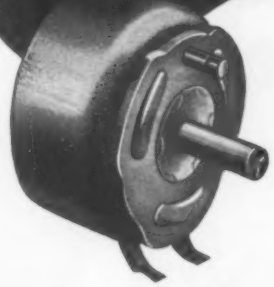
▶**Both Faces Used**—At the same time, the ability of the chain to mesh on both faces is not sacrificed, as in the application involving two sprockets, where the required direction of rotation is not the same. This is illustrated in Fig. 2, where the arrangement at the left-hand sprocket is as in Fig. 1, and the right-hand unit is required to rotate in the opposite direction and mesh with the other side of the chain. As shown, it is only possible to place the chain on the underside of that sprocket, for which the guard is installed offset to allow the plate extension to pass.

▶**No Patent**—Renold and Coventry Chain Co., Ltd. state that in order to make the chain freely available no patent has been applied for.

Agent for the company in the U.S.A. is General Chain & Belt Co., 292 Lafayette St., New York City.

LEDEX

ROTARY SOLENOID



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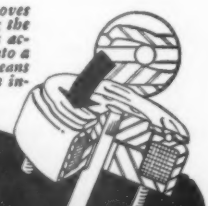
Torque lb./inches	¼	5	10	25	50
Weight lbs.	⅛	½	1	2¼	4½

Magnetic action moves the armature along the solenoid axis. This action is converted into a rotary motion by means of ball bearings on inclined races.



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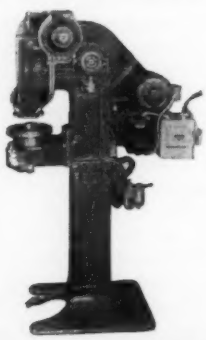
T-J RIVITOR used for automotive clutch plate assembly. Saves time and labor doing a four-fold job—assembling, setting, inspecting and ejecting.



Set clinch nuts 3 to 5 times faster with a T-J Clinchor! Fully automatic ... controlled by a single foot pedal. Available in Underfeed and Gravity feed models, throat depths 8" to 36".

For *high production* ... T-J Rivitors! Automatically feed and set solid rivets. Set 1/16" to 1/4" diam. solid steel rivets up to 7/8" long using *electrically powered* Rivitor ... aluminum alloy rivets up to 1/4" diam. or steel rivets up to 1/8" diam. and up to 3/4" long, using *air powered* Rivitor. Throat depths, 8" to 36".

Speed up assembly in aircraft, farm machinery, automotive, stampings of all kinds ... with T-J dependability! Write for Clinchor bulletin 847; Rivitor bulletins 646 and 847. The Tomkins-Johnson Company, Jackson, Michigan.

35 Years Experience

T-J TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

Diversification

It has enabled Ryan to get deeper into military output with few troubles.

Ryan Aeronautical's diverse production setup has been proving its worth in the current switchover from civilian output to military work.

By getting deeper and deeper into handling precision aircraft and engine components subcontracting since World War II, the San Diego manufacturer kept together a stable skilled labor force and facility capable of taking on a changed production picture without facing many of the problems confronting other firms.

Now it looks like increasing orders are going to test Ryan's know-how to the fullest. Backlog of the firm at Jan. 31 this year—over $29 million—was more than four times fiscal 1949's $6,298,827.

▶ **Two Divisions**—Ryan's versatile makeup consists of two divisions—Airplane and Metal Products—which contribute to the overall know-how needed in aircraft and components manufacturing.

The Airplane division is responsible for manufacturing and sales of the four-place Navion, production of major airframe components and assemblies on subcontract from other aircraft makers, and design and development of new type aircraft and other aviation and electronic equipment.

Metal Products work deals with products made of high heat-resistant alloys, such as exhaust systems and allied items, heat exchangers, and thermal anti-icing equipment; and major turbojet components and accessories.

Sales volume of the Airplane division's Navion executive plane last year for aircraft, spare parts and service work was up to $2,646,935, a profit, before income taxes, of about 3.8 percent on sales volume, compared with a slight loss for the prior year. About 2350 Navions are in service. Total airplane division sales during fiscal 1950 were $5,648,889.

▶ **Navion Picture**—Although the company, after looking over the materials situation, decided to limit 1951 Navion output to the number producible from materials on hand or on order, there's still the possibility that from Army Ground Forces will come initial additional orders, on which Ryan has already submitted a bid and proposal. L-17B Navions in service in Korea have been effectively handling personnel transport, rescue operations, spotting enemy armor and troop concentrations, and leading jet fighters into the targets.

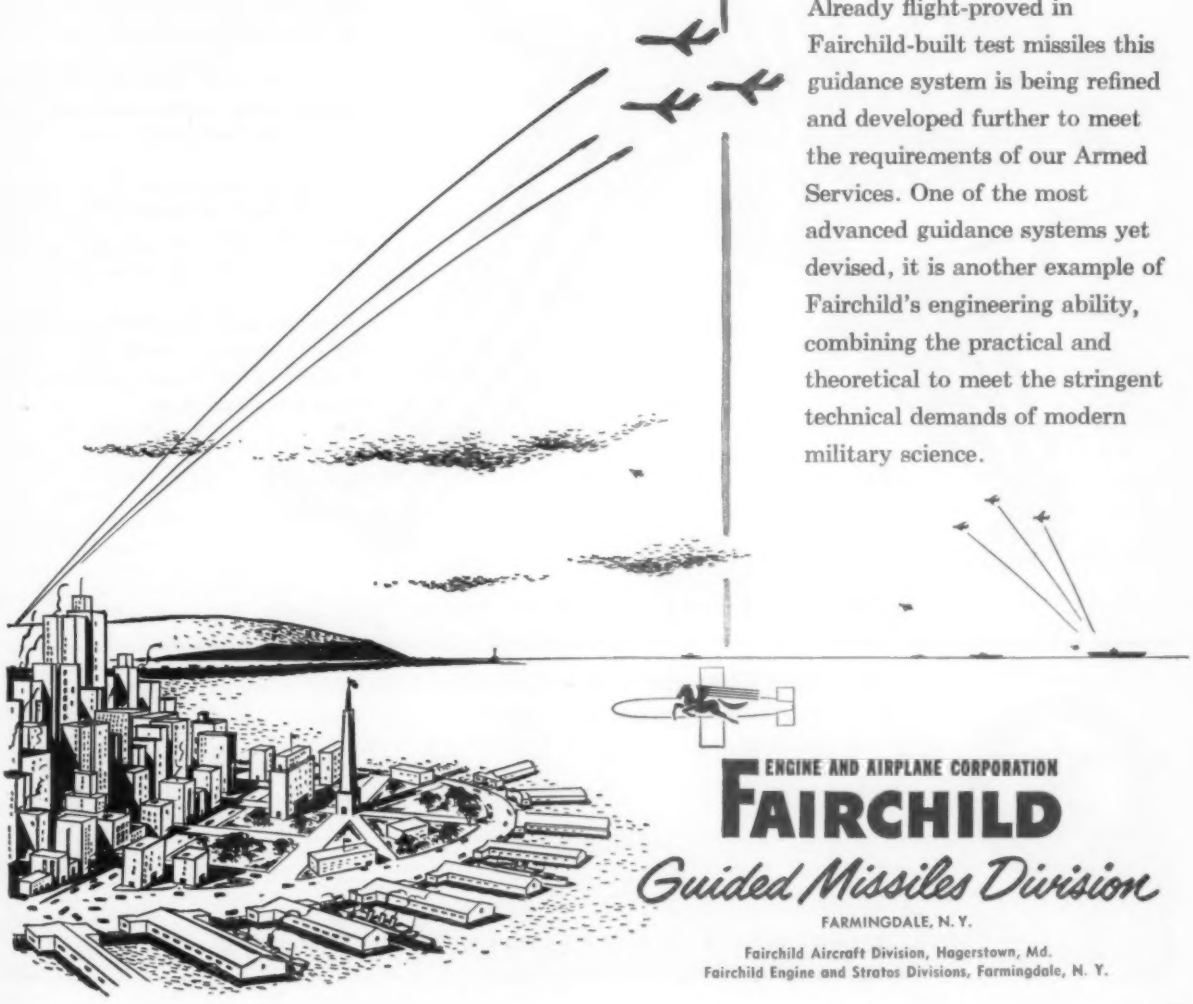
Even if these contracts don't come through, the plane production facilities

BRAIN WORK

high in the heavens

GUIDED MISSILES that become more accurate as they close the range on attacking enemy aircraft are being developed by the Fairchild Guided Missiles Division. Missile experience dating back into World War II has enabled Fairchild engineers to design a guidance system which "homes" on radar echoes reflected from attacking planes and cuts down the margin of error the closer the "bird" gets to its target.

Already flight-proved in Fairchild-built test missiles this guidance system is being refined and developed further to meet the requirements of our Armed Services. One of the most advanced guidance systems yet devised, it is another example of Fairchild's engineering ability, combining the practical and theoretical to meet the stringent technical demands of modern military science.



ENGINE AND AIRPLANE CORPORATION

FAIRCHILD

Guided Missiles Division

FARMINGDALE, N. Y.

Fairchild Aircraft Division, Hagerstown, Md.
Fairchild Engine and Stratos Divisions, Farmingdale, N. Y.

It's time we got *working* mad!

As we listen to the latest insults from Moscow, we're likely to get fighting mad.

Instead, we'd better use our heads and get *working* mad.

It is clear by now that Stalin and his gang respect just one thing—strength. Behind the Iron Curtain they've been building a huge fighting machine while we were reducing ours. Now we must rebuild our defenses—*fast.*

As things stand today, there is just *one* way to prevent World War III. That is to re-arm—to become strong—and to stay that way!

This calls for better productivity all along the line. Not just in making guns, tanks and planes, but in turning out civilian goods, too.

Arms must come first. But we must produce arms *at the same time* we produce civilian goods.

We can do this double job if we all work together to turn out more for every hour we work—if we use our ingenuity to step up productivity.

All of us must now make sacrifices for the common good. But we're working for the biggest reward of all —*peace with freedom!*

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can be used for handling ever increasing airframe components subcontracts, such as large fuselage sections, cargo doors, floor beams and other assemblies for the Boeing C-97 Stratofreighter, and large external fuel tanks designed by Ryan for the B-47.

A large portion of the firm's research and development work is now taken up on the AF-Navy XQ-2 jet-propelled pilotless target plane, on which Ryan is doing both electronic guidance and airframe design.

The Metal Products branch was the source of Ryan's biggest sales volume and earnings, ($6,863,962 in fiscal 1950) with leading aircraft engine makers joining the plane builders in becoming customers for the firm's specially designed exhaust systems. A new source of exhaust system business was for new Army tank engines. Replacement and spare parts of exhaust systems constitute a healthy volume during the service life of airplanes and engines.

A lot of Ryan's exhaust systems experience proved handy when the company took on subcontracts for General Electric's J-47 turbojet building stainless steel exhaust cones, tail-pipes, burner liners and other assemblies. This department is also at work on rocket motors and guided missiles components.

By Feb. 1, there were 2824 employes on the payroll, and the figure is still rising.

This Subcontractor Was Easy to Find

A flood of Air Force business has put a Buffalo, N. Y., equipment manufacturer in the curious position of being a subcontractor on its own product.

The company is A. E. Bausenbach, Inc., manufacturer of metal containers in which jet engines are hermetically sealed for shipping or storage. Recently (Aviation Week Mar. 5) the Air Force announced a $3,070,624 order for the containers. But instead of going to the Bausenbach company, the prime contract went to its big neighbor, American Locomotive Co., Dunkirk, N. Y.

Here's why: The Air Force requires posting of a performance bond by a contract recipient. In this case, the bond would have been larger than the Bausenbach firm's net worth. Therefore, the contract was negotiated in the name of American Locomotive Co.

As subcontractor, Bausenbach will handle about $1.1 million—or 36 percent—or the $3,070,624 Air Force order. The other 64 percent will be handled by American Locomotive Co., and that, according to Arthur E. Bausenbach, president of the Buffalo firm, is "a plain case of the tail wagging the dog."

DISTINGUISHED AEROTEC FAMILY OF *Controls*

KEEPS PACE WITH A

famous Grumman line!

Dependable and rugged Grumman fighters have contributed greatly to Naval air strength for many years. On these fighters, as well as Grumman's attack and amphibian aircraft, Aerotec controls have been specified in increasing quantities. The latest F9F utilizes Aerotec float controls, valves, and pressure controls.

Grumman's latest planes, still shrouded in security, will employ Aerotec controls.

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SECTION 3

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STOCK COMBING by N. McMahon, D. O'Leary and O. Johnson cuts UAL's costs.

Mechanized Control Saves Money

UAL's change-over from manual inventory recording puts more items on the shelf, but cuts investment.

By mechanizing inventory control records, United Air Lines has been able to buy more equipment, stock a greater number of items to provision newer airplanes and yet reduce inventory value and maintain inventory control with fewer manhours and less cost.

The company placed seven Boeing Stratocruisers in service in 1950 yet inventory level at year's end was $4.5 million, compared with $6.2 million in 1949 and $6.3 million in 1948. Manhours in handling 53,600 different kinds of items last year were 20,000 less than in 1948 with 36,500 items. Cost of taking annual inventory in 1950 was $5400 as against $7000 in 1948, despite a one-third increase in types of items stocked.

United's Purchasing and Stores department has 242 employees, with 32 directly associated with purchasing. Last year they placed 27,615 orders totaling $23.1 million, of which $12,750,000 was for fuel and oil. The 1949 bill on 21,228 orders, including $10 million for fuel and oil, amounted to $17.5 million. Company stock rooms issued 11,228,400 items in 1950.

▶**From Hand to Machine**—United claims to be the only airline that has completely mechanized its inventory control records. The old method of posting inventory issues by hand was satisfactory until four-engined planes took the airways. The DC-4 required stocking 15,000 different items in 1946; DC-6's added another 10,000 items the following year. Daily stock issues skyrocketed from 750 to 3000, and errors caused by hand posting piled up at an alarming rate.

Change-over from hand posting to IBM mechanized inventory control was preceded by a three-month test in the summer of 1948. Two sets of records were kept on 4000 items, one by hand, the other by machine. At the end of the test 10 percent of the hand-posted and machine-calculated balances failed to jibe. Subsequent checking disclosed that hand posting was at fault in every case.

Mechanization was completed late in 1949. Earlier that year D. V. O'Leary became director of Purchasing and Stores and began trimming off inventory fat accumulated while adding new flying

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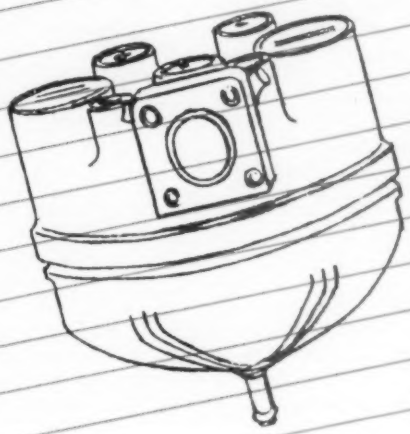
on America's first Production Jet



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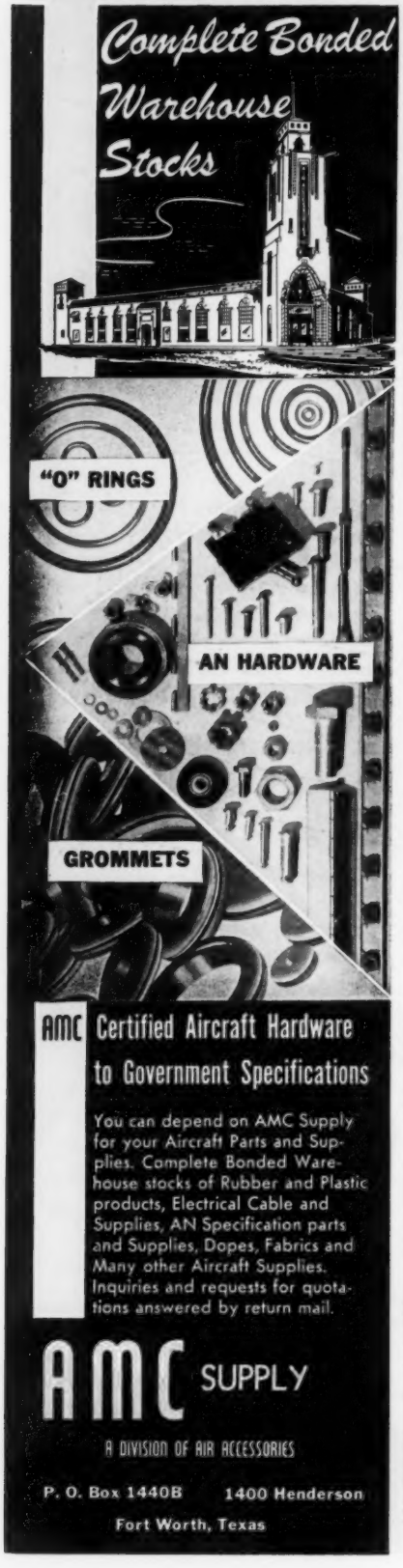

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AMC SUPPLY

A DIVISION OF AIR ACCESSORIES

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equipment in the postwar period. Mechanized inventory control, developed by N. J. McMahon, staff superintendent in Purchasing and Stores, provided a sharp scalpel.

By ferreting out deadwood, duplications and other irregularities, the system has enabled United to slough off $1.7 million from inventory. Formerly, for example, 4600 separate kinds of DC-3 airframe items were stocked. Today there are 2739. The decline in inventory has been paralled by a 50 percent reduction in out-of-stock incidents so that, paradoxically, more orders now are filled with less on the shelves.

▶ **How It's Done**—Purchasing and Stores has 15 inventory analysts who each ride herd on approximately 3500 items. Through IBM reports at weekly, monthly and quarterly intervals, they keep track of an infinite number of blown-fuse bags, rudder pedal links and 53,598 other articles as easily as a housewife checks off the family laundry list.

Analysts receive weekly reports covering issues of all items within their domain. Study of the report shows which stocks have reached the order point and whether runs have developed on any particular item. The latter bears careful watching in view of slower delivery of materials affected by the defense program. A skilled analyst can spot incipient runs so that stocks may be replenished in time.

A monthly report gives complete data on inventory status. Current balances of each item are listed, along with prices for computation of inventory value. Within several days after the business month ends, Purchasing and Stores informs management of the exact amount of material consumed, its cost and quantities remaining.

The quarterly report has two sections. One lists all items issued in the previous three months and their respective value. The other section isolates items which have gathered dust on store shelves throughout the quarter, while subdivisions show those inactive for longer periods. Inventory pruning thus becomes an easy matter.

▶ **By-Products**—Apart from keeping United's inventory shipshape, machine reports have important side uses. For example, they separate low-dollar from high-dollar items so that attention can be concentrated on the latter. They also yield data for accurate forecasting of supply costs and special reports to management.

United supplements mechanized inventory control with documents, procedures and techniques that collectively add up to hefty savings in cash and manhours. Among these are:

• **Monthly usage ratio chart** that enables United's buyers to order for DC-3s, DC-4s, DC-6s and Boeing Stratocruisers on the basis of a mathematically determined rate of consumption. The chart correlates such factors as the usage rate in previous months and forthcoming increases in flying time. It is especially valuable in this period of delivery lags, since required quantities as of any future delivery date are precisely calculated.

• **Stores catalogue** of every item on inventory, kept up to date by daily changes at United's San Francisco maintenance base. A new page can be printed or an old one revised in 42 seconds. Items are classified under nine general categories, ranging from engines and parts to hardware, raw stock and upholstery supplies. Coded notations indicate the location of each item and whether parts are interchangeable.

• **Combined purchase order** and receiving report which eliminates multiple typings. Formerly, in buying any item, a ten-copy purchase order and a six-copy receiving report had to be typed separately. The new document consists of an original and nine copies typed simultaneously.

• **Re-order card** which obviates typing up new requisitions for each transaction. The card has the further advantage of showing the history of any item, purchase by purchase, along with comments of company buyers.

• **Mathematical formula** which enables buyers to determine when discounts are economical in relation to the time a given quantity will be carried on inventory. Discounts can be deceptive. An apparent savings may be eaten up by insurance, handling and other costs.

Still other economies have come from centralized control of Purchasing and Stores. Prior to November, 1949, they were separate departments employing 367 as against 242 today. Of these, 181 are stationed at the San Francisco maintenance base.

▶ **How UAL Buys**—Any firm billing United for $250 or more per annum must qualify for the Approved Vendors List of the Purchasing and Stores Department.

To obtain listing, vendors must stand up favorably under scrutiny of their credit ratings, business ethics, permanecy, and other criteria. About 800 vendors currently are listed.

In addition to maintaining supplies for seven Stratocruisers, 44 DC-6s, 24 DC-4s and 58 DC3s, United currently is provisioning for 30 new Convair-Liners Model 340. Delivery of these 44-passenger, twin-engined transports begins next year. Supplies for 20 new DC-6Bs, now being delivered, already have been stocked.

O'Leary takes an optimistic view of supply snags created by the defense program and he reports that United has suffered no acute pinch to date. "Delivery time is from 20 to 50 percent

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Just ONE Punched Card for payroll plus

cost accounting
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quality control

As a by-product of their punched-card payroll system, the Greenfield Tap and Die Corporation controls production efficiency and holds down rework and spoilage costs!

The same basic job card that prepares their payroll is used for automatic compilation of Cost figures and Labor Distribution. Inspection rejections are known to management daily, and as a result, preventive measures may be exercised *during* production rather than after completion of jobs.

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1 *Ideal insulation must be light in weight and bulk.*

REFRASIL batt has a surface density of .05 lb. per sq. ft. and a nominal thickness of 3/16 in. Pre-fabricated blanket for typical jet tailpipe is only ½ in. thick. REFRASIL is resilient—will not pack down or disintegrate under vibration.

2 *Ideal insulation must reduce temperature to safe level for structure and personnel.*

REFRASIL pre-fabricated removable blanket with nominal thickness of ½ inch, will give a temperature drop from high of 1300° F. to low of 300° F. REFRASIL will withstand sustained exposure to temperatures up to 1800° F. and flash temperatures of 400° F. more, without breakdown.

3 *Ideal insulation must be easy to install and remove from equipment.*

REFRASIL is available as pre-fabricated removable blankets, preformed to any desirable specifications. Insulating efficiency of REFRASIL Blankets is not affected by frequently repeated removal and installation operations.

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slower on some items," he says, "but that merely calls for planning to offset the lag. There's no reason to get panicky.

"The percentage of products going to the military is less than in World War II and the nation's industrial potential is expanding daily. Furthermore, government officials and private operators have the benefit of comparatively recent wartime experience in coping with regulations and controls on materials."

New Heavy-Duty Ground Connector

(*McGraw-Hill World News*)

London—A heavy-duty electrical ground connector for aircraft has been put on the market by The Plessey Co., Ilford, England.

Unit connects ground electrical equipment with planes to supply current for engine starting and other purposes. The device is designed to carry both 24 and 120v; continuous current rating is 250 amp.; momentary peak load is 1500 amp.

Connection is made by domed butt contacts tipped with a special type of metal to insure low contact resistance. Joining is accomplished by trigger action and spring-loaded contacts on the cable unit give accurate alignment and proper contact pressure when the two parts are mated. Both units have a safety device to make sure that the main contacts are "dead" until the two portions are fully joined.

A slam catch retaining lock is used to prevent the cable from being disconnected accidentally and a trigger release is provided to disengage the connector.

The aircraft unit is fully pressurized, and the ground section's contacts are protected with rubber.

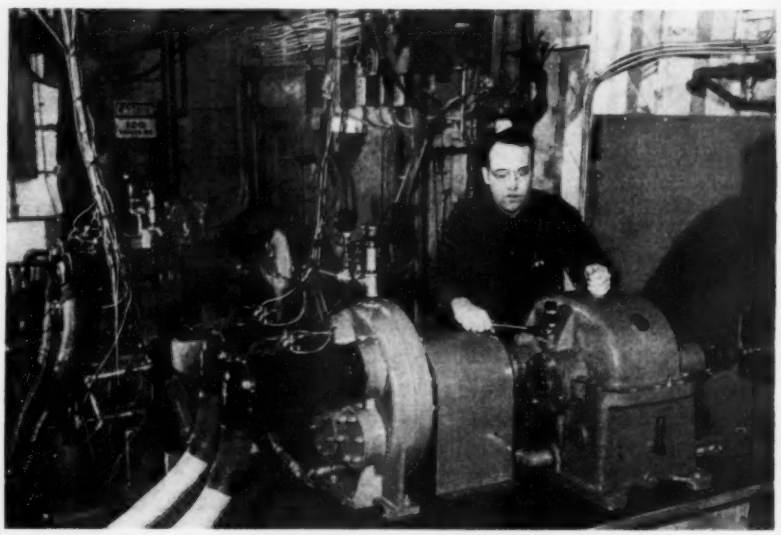
Outlet of the cable unit is set at an angle of 25 deg. to give a convenient cable run irrespective of where the unit is mounted on an aircraft.

Plug Meeting

(*McGraw-Hill World News*)

London—Lodge Plugs Ltd., Rugby, will sponsor a European Ignition Conference in 1951, along similar lines to the very successful one held in London in April 1950.

Location, as before, will be the Savoy Hotel, London, on July 17-18. Air Commodore F. R. Banks, of the Associated Ethyl Company Ltd. will again be chairman of the sessions.



AIRCRAFT ELECTRICAL SYSTEM DUPLICATOR

These three General Electric test stands duplicate complete aircraft electrical systems. Each stand, powered by a 450-hp. radial plane engine, is capable of reproducing with precision normal and overloads, over-voltages, short circuits and other occurrences to an aircraft's electrical system while in flight. The stan.l determines whether generators, alternators, distribution circuits and control systems can operate satisfactorily under all conditions. GE engineers say that the test stands are currently being used for development of 28v. dc. systems for commercial and military planes, also for 400 cycle ac. and 120v. dc. control circuits. They add that design of new equipment has been materially aided by use of the test units since much of it is "de-bugged" before being placed in actual operation in aircraft electrical systems.

DOUGLAS SPEEDS PRODUCTION...

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The Complete Polyester Laminating Material

DOUGLAS C-124

Designed and built to carry a tremendous payload. The Globemaster has already exceeded expectations by taking off at a gross weight of 194,000 pounds. Many structural parts are made of Dryply because of its light weight and flexural strength . . . plus the ease of forming complicated shapes.

EASE OF HANDLING SAVES TIME AND LABOR! The simple operations with Dryply . . . the READY-TO-USE, LOW PRESSURE, LAMINATING MATERIAL . . . have stepped up production at Douglas and other aircraft plants. Lay-ups in seconds . . . parts formed rapidly because the pre-impregnated glass cloth or mat is easy to cut and simple to handle. *Unskilled* labor does the job!

The Polyester fiberglas combination makes Dryply, pound for pound, one of the strongest materials known, yet extremely light in weight.

MANY USES IN AIRCRAFT... Equipment containers—heat and vent ducts—kick panels—window panels—door fairings—cowling fairings—wing tips—interior lining for cargo planes—skins for honeycomb structures—military tote-boxes—and, also, tooling.

New uses for Dryply are found each day . . . so check your material needs! Inquiries invited!

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TEST AND INSPECTION ENGINEERS —Practical knowledge of radio, radar, or TV manufacturing processes. Good knowledge of radio fundamentals essential. Base salaries from $3900 to $5880.

TECHNICAL WRITERS — Knowledge of radar fundamentals or radio required. Work closely with engineers to gather material for instruction and maintenance manuals. Base salaries from $3400 to $4300.

LABORATORY TECHNICIANS — Require knowledge of radio fundamentals and skill in use of measuring instruments and laboratory equipment. Previous industrial experience essential. Salaries from $262 to $321 per month.

BASE SALARIES FOR ALL POSITIONS LISTED ABOVE ARE SUPPLEMENTED BY UP TO 30% FOR REGULARLY SCHEDULED 48 HOUR WEEK.

Housing is no problem in Baltimore.

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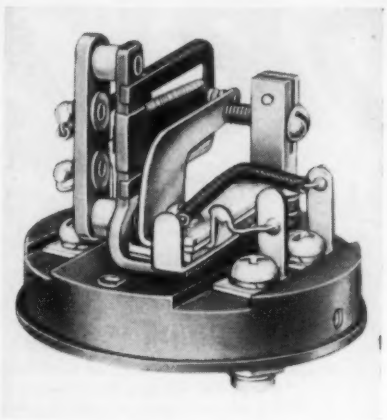


Time Delay Relay

A thermal time delay relay, which may be adjusted for time intervals from one to 20 seconds, has been placed on the market by Wilcolator Co., Elizabeth, N. J.

The unit is accurate to ¼ sec. and is temperature compensated through a range of —65 to 160 F. Contacts on the device normally are open. Heater rating is one ampere and contact rating is three amperes at 29v. dc. The compact relay is mounted in an aluminum-alloy case. Similar units for longer time intervals and higher voltages are being developed, the company says.

Belts Grow Teeth

A rubber and fabric drive belt with teeth has been perfected after twelve years of development by the U. S. Rubber Co.

Known as the Gilmer Timing Belt, it is considered by its developers "the most outstanding advance in power transmission during the past 50 years."

The novel belt can be produced in a wide range of sizes for large and small mechanisms such as may be found in aircraft. It will not slip and will withstand overloads that ordinarily would break gear teeth. The new belt permits utilization of the full power of a mechanism, eliminates creep and speed variation. It guarantees uniform rpm. between driver and driven parts, synchronizing perfectly the speed between the pulleys according to the firm. These are grooved to engage with corresponding teeth on the belt.

The rugged belt, reinforced by steel cables for high loads and high-strength cotton cord for light duty, permits delicate, split-second timing. It is efficient at low speeds of inches per minute or high speeds up to 16,000 ft./min. The belt operates more quietly than precision gears running in an oil bath, says the company.

Its use can result in a drive installation that is much smaller than would be possible with gears or conventional belts, its developers claim. Speed ratios up to 30:1 are possible and the belt's extreme flexibility permits the use of pulleys with diameters of ½ in. operating at 10,000 rpm. under a heavy load.

U. S. Rubber believes initial cost of the belt may be lower than other types of drives because of smaller drive constructions. No take-up mechanism is needed, the belt operating on fixed centers without take-up adjustment. Since it needs no initial tension it has "unusually high efficiency with extremely low bearing pressure," according to the company. It also eliminates the need for lubrication, but oil will not harm it.

The belt is being produced at U. S. Rubber's L. H. Gilmer division, Philadelphia.

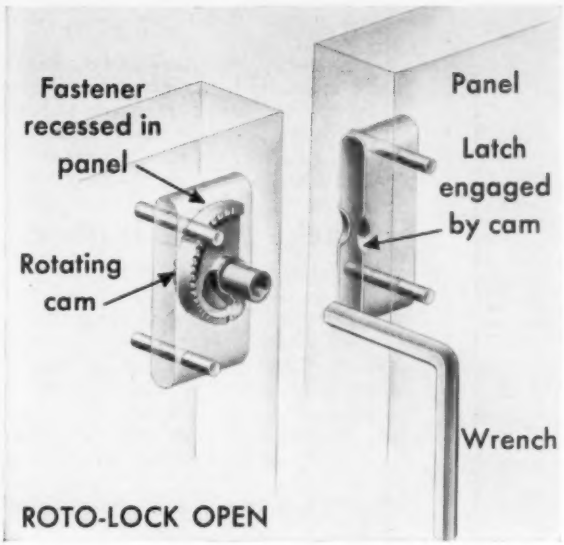
Sweetens Aircraft

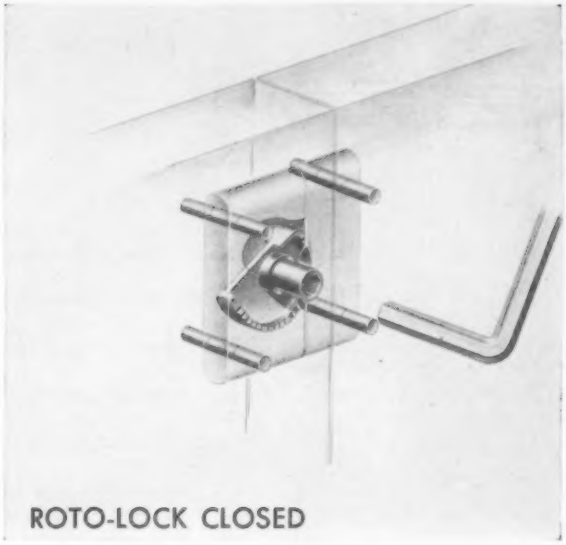
A simple method of controlling odors in aircraft and other chemical toilets has been developed by Fine Organics, Inc.

The company has developed "Stratotab," a quaternary ammonium tablet, which simply is broken into pieces and dropped into the waste container to dispel odors.

A single tablet will deodorize three gallons of waste immediately, says the firm. Odors developing in flight because of excessive temperatures and loading can be stopped by addition of another tablet, it explains. To give visual proof of treatment, the tablet releases a color on dissolving.

According to Fine Organics, "full scale tests on hospital aircraft in the Korean war theatre have resulted in adoption of the product by the U. S.





More than a fastener...

a revolutionary construction principle

ROTO-LOCK makes butt or right-angle joints quickly and securely... simplifies demountable construction

Roto-Lock, the ingenious Simmons locking device, works with just a twist of a wrench... a cam pulls parts together. When gaskets are placed between panels, Roto-Lock exerts sufficient pressure to form a weatherproof, watertight seal.

Easily installed by unskilled labor in *any* material, this revolutionary Simmons Fastener is ideal for any type of demountable construction—from Army shelters or temporary hangars to lightweight knockdown shipping boxes, desks or tables. Recessing completely, Roto-Lock leaves no exposed parts when closed. It will fasten in misaligned conditions.

Built of materials highly resistant to corrosion and wear, Roto-Lock features design simplicity...has no springs or other delicate mechanisms affected by severe climates. Literature, showing numerous Roto-Lock applications and complete design specifications, is available to help you solve *your* fastening problems. Write for it today.

SIMMONS FASTENER CORPORATION
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SPRING-LOCK • QUICK-LOCK • ROTO-LOCK

COLLINS Radio Company congratulates Western Air Lines for rounding its first quarter century of magnificent service to the American public. We are proud to recall that you started using Collins radio equipment when you were only half your present age.

WESTERN AIR LINES 1928 AMERICA'S OLDEST AIRLINE 25th 1951 ANNIVERSARY

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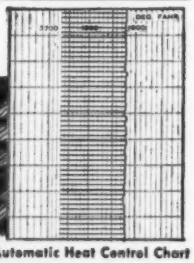

Automatic Heat Control Chart

GRAIN SIZE OF STEEL IS ALWAYS UNIFORM

Automatic heat control in our patenting or heat treating furnace operates within such close limits that the temperature in the furnace never varies more than a small fraction of one per cent.

High resistance to bending fatigue with resultant longer life and greater reliability is assured in Wickwire Aircraft Control Cable because grain size of the steel is always uniform to exacting McQuaid-Ehn* standards.

Only a fully integrated company like Wickwire can give you this big advantage...because such control of grain size is possible only where all phases of manufacture are under constant check and test.

Here again—Wickwire goes "beyond specifications" to give you assurance of aircraft control cable that can't be beat for safety, reliability and long-lasting service.

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

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CF&I A SUBSIDIARY

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORP.

EXCLUSIVE DISTRIBUTORS OF WICKWIRE AIRCRAFT CONTROL CABLE

AIR ASSOCIATES, INC., Teterboro, N. J.

*Write for information on the McQuaid-Ehn test to Wickwire Rope Sales Office, Palmer, Mass.

Air Force under the designation FO-201."

Stratotabs are packed in cylinders of 18 tablets (50 packages per case), are protectively coated to insure stability in storage at temperatures from −60 to 120 F. Fine Organics' address is 211 E. 19 St., New York 3.

Stacks Stock Higher

If you have valuable storage space still available between your tiered stock and the ceiling, but can't use it because your present loading equipment won't reach that high, your problem may be solved by a new lift truck accessory developed by Yale & Towne.

It's an attachment consisting of an extra set of channels and lifting cylinder that gives "triple" lift to standard Y&T fork lift trucks. With it, a truck can tier loads in stacks higher than 16 ft.

The extra channels are hung directly in front of the regular telescopic lift and are operated by a separate control. The attachment can be removed quickly for normal operations.

With production expanding to meet defense needs, Y&T points out its development permits industrial concerns "to utilize to the full available storage space now considered critical from a cost and availability standpoint." Address: Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15.

ALSO ON THE MARKET

Snap-acting bimetal thermostats, particularly suitable where sensitive, precise control of high-wattage heater loads is required, are supplied in non-adjusting and adjustable models and can operate with a fixed differential of 5F. in a 400F. temperature range. Made by Stevens Mfg. Co., Inc., 69 S. Walnut St., Mansfield, Ohio.

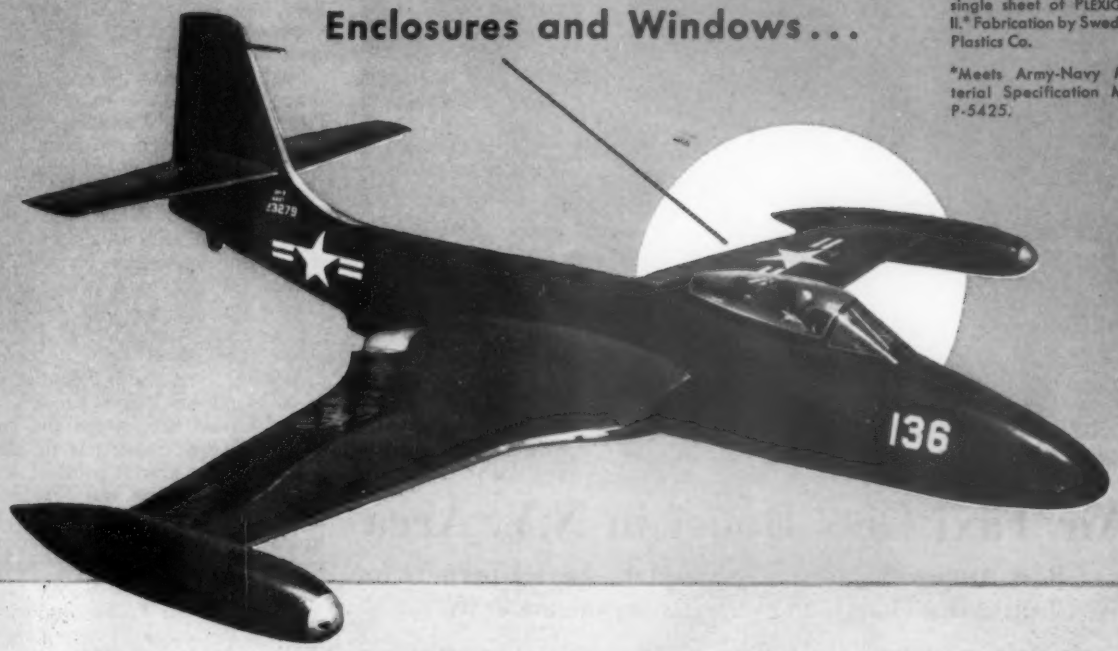
Mechanical torque screwdriver automatically disengages when required torque is reached. It is available in two models, both adjustable. One type is for hand operation only, has maximum torque setting of 15 in. lb. Other model can be used in hand drill or press and can be adjusted to maximum of 25 in. lb. Made by Overload Control Co., 260-63 Langston Ave., Glen Oaks, L. I., N. Y.

Luminescent packaging tape for sealing and marking boxes and other containers uses Geon paste resin made by B. F. Goodrich Chemical Co., for toughness, abrasion and chemical resistance and flexibility in hot and cold temperatures. Tape is "ideal for use in blackout areas," says maker, Century Coating Co., Whitestone, L. I., N. Y.

Aviation's Standard Material for Transparent Enclosures and Windows...

PLEXIGLAS canopy on McDonnell F2H-2 Navy jet fighter. Nearly 8 feet long, the canopy is a formed single sheet of PLEXIGLAS II.* Fabrication by Swedlow Plastics Co.

*Meets Army-Navy Material Specification MIL-P-5425.



PLEXIGLAS

The use of PLEXIGLAS on military and commercial planes is a long-standing practice in the aviation industry. For more than ten years the optical clarity, light weight, toughness, and formability of this acrylic plastic have maintained the position of PLEXIGLAS as the standard material for transparent enclosures and windows.

For the nation's newest planes, PLEXIGLAS is still the standard transparent material. PLEXIGLAS II, for example—notable for its superior heat resistance and good stress-solvent craze resistance—meets the rigorous specifications of today's high speed, high altitude aircraft. And for the elevated service requirements of planes of the future, Rohm & Haas laboratories are working to raise the standards of transparent plastics to even higher levels.

Our laboratories and service departments, with their years of experience in working with plane manufacturers, are ready to assist you on technical problems in the aviation applications of PLEXIGLAS. Complete details on properties and methods of handling are contained in our Design and Fabrication Manual —yours on request.

Chemicals for Industry

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

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SALES & SERVICE

AIRLINE PASSENGER heads for ever-ready Appointment Airlines' Bonanza air taxi.

Air Taxi Gets Boost in N.Y. Area

Port Authority gives two operators special permits for shuttle and charter flights with one-engine craft.

Local air taxi service in cooperation with the scheduled airlines has gained an opening wedge in the New York area with establishment by the Port of New York Authority of a special airport taxi operator classification and granting of the first two permits. Two local operators will provide supplemental air transportation from PNYA's terminals to neighboring communities not served by the scheduled carriers.

The Authority has also petitioned the Civil Aeronautics Board to ease some of the provisions of the economic regulations pertaining to regularity and frequency of operations of small irregular carriers, to encourage their growth.

The first two, and thus far only, permits were granted by PNYA on Dec. 1 to Appointment Airlines, Inc., of New York, and Air Taxi, Inc., of Red Bank Airport, Inc., N. J. The permit also gives the two operators the right to conduct charter and aerial sight-seeing flights at the Authority's terminals.

▶ **Percent of Gross**—The financial arrangement is worked out on a percentage of the permittees' gross income: Trips within a radius of 50 mi. from a PNYA airport, 10 percent; 50-125 mi., 7½ percent; over 125 mi., 5 percent. Port Authority requires that the operators carry $100,000-$300,000 public liability coverage and $500,000 property damage insurance. The public liability requirement is based on the fact that Appointment and Air Taxi now operate 3-passenger Ryan Navion and Beech Bonanza aircraft.

Since the equipment is single-engined, the Port Authority also requires that the permittees conduct their flying according to VFR rules, and their operations are subordinated to the scheduled airlines.

▶ **Appointment First**—First to start service under the new ruling has been Appointment Airlines, headed by radio and television performer William L. Cullen. The carrier was incorporated in New York in 1950 and is capitalized at $30,000. Theodore Golden, a surgeon, who is also a private pilot, is vice president, and Martin Goodman is treasurer. Golden has been flying a dozen years and holds a commercial land and sea rating.

The line has a Beech Bonanza and a Ryan Navion, expects to acquire another Bonanza, also a Twin Beech for long-range charter operations. The three pilots have a minimum of 5000 hr. and hold all ratings, including A&E. The pilots handle all routine maintenance on their planes, with heavier work done by Atlantic Aviation, Teterboro, N. J.

Air Taxi, Inc., is a division of Red Bank Airport, Inc., a typical fixed-base operation, headed by W. R. Laudenslager, which has a flight school and handles sales and service for Beech and Piper. The taxi service, now bases a Bonanza every day at LaGuardia Field, next will have one each at Newark and N. Y. International. The carrier has six qualified pilots.

▶ **Close to Carriers**—Both services have set up informal relations with the scheduled carriers at the Port Authority air terminals—that is, they work with the ticket counter agents, who send them business, such as passengers who have come to the wrong airport to get their plane and have to be ferried to the proper terminal in time to make connections.

Flights are handled on a flat rate basis of approximately $12 between airports. Trip takes about 12 minutes, whereas a surface cab between the main airports (New York to New Jersey) costs approximately $12.50 and takes from 40 min. to 1½ hr. Where the error is due to faulty ticketing, the airlines have picked up the tab for getting the passenger to the proper spot in time.

Appointment and Air Taxi utilize phone answering services and have phone coverage at each of the fields permitting contact with potential clients on a round-the-clock basis.

Regular air taxi, where the airlines will ticket their passengers through all the way to the nearest point of destination by using these taxi "feeders," is still dependent upon directives being issued down through the organizations making it mandatory for passenger agents to sell tickets in this fashion. Although the Air Traffic Conference of America has come to agreement with the carriers on using this approach, a checkup of the main airlines in the New York area found their staffs unfamiliar with any such arrangement.

▶ **Useful Contacts**—Thus at this time, the airport shuttles can hardly justify the existence of the two operators, but they do come in handy in building contacts for charter flying which is now their mainstay.

For instance, Appointment has picked up charter business from the airlines to fly aircrews to pick up aircraft or transport executives on official business.

In February, Appointment flew 40 shuttle trips for a total of 2992 shuttle passenger miles, Air Taxi handled approximately 35 trips.

BRIEFING FOR DEALERS AND DISTRIBUTORS

▶ **Improves Instrument Service**—Winged Instrument Co., owned and operated by Bud Reed, has moved its aircraft instrument overhaul shop from Norwood, Mass., to Bedford Airport, Mass., to provide more complete service to executives and operators in this territory.

▶ **Cleco Appointment**—Cleco division of Reed Roller Bit Co., Houston, Tex., has named Olson Equipment Co., 2930 Blaisdell Ave., Minneapolis, as distributors of Cleco pneumatic tools in that area.

Military Jetliner Meets Jet Age Requirements

To meet the more exacting demands of the jet age AVRO Canada offers a high performance military version of the Jetliner.

The Jetliner is designed to cruise at speeds of 460 MPH at 35,000 ft. with cabin pressure maintained at 6,000 ft. Its operational ranges exceed 1200 miles.

The Jetliner's rapid climb, high cruising speed and highly pressurized cabin offer excellent [illegible]cations. In spite of its high speed performance, it has ideal low-speed handling characteristics. The Jetliner's low-slung configuration simplifies servicing and maintenance.

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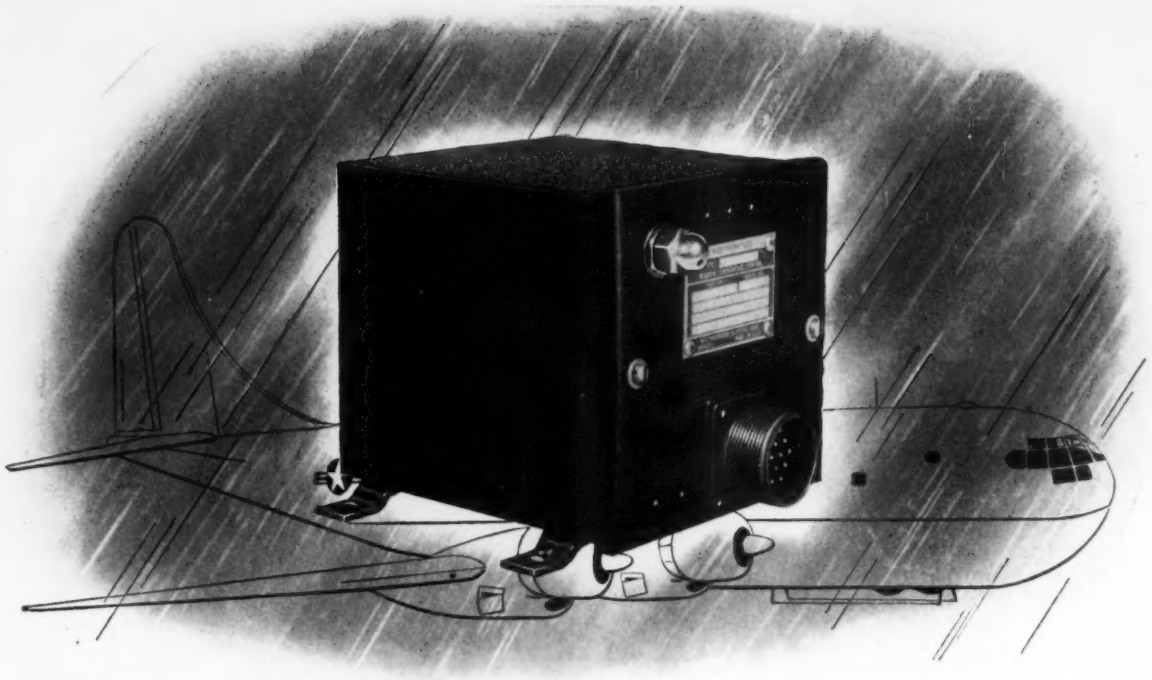

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Count on unobstructed vision when your window heating system is protected by Westinghouse electronic control. This versatile flight-proved unit is used primarily for controlling window temperature in de-icing and de-fogging installations. It may be applied to any type of system—electrically conducting glass, hot air or infra-red.

Sensitive—Control holds temperature within plus or minus 5 degrees F. of the selected nominal setting. The center control temperature may be adjusted to any point within a range of 32 degrees F. to 250 degrees F. Other sensitivities and ranges available upon request.

Safe—Possibility of overheating glass is eliminated. If a fault—either short or open—should occur in sensing element circuit, or power to the control should fail, power to windows is removed.

Sure—Operation is completely reliable. Equipment is designed to meet AN specifications on vibration, winterization, salt spray, dielectric and life tests.

When you need reliable temperature control, call your nearest Westinghouse representative or write Westinghouse Electric Corporation, Aircraft Department, Lima, Ohio. J-03005

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Westinghouse

AVIATION
EQUIPMENT

FINANCIAL

'50 Reports Not What They Seem

Nature of aircraft industry works against final annual accounting, with adjustments spread out over years.

Taxes place an important qualification against the reported peak aircraft earnings of last year. Other major adjustments such as price redetermination and contract renegotiations could also make necessary a revision of 1950 earnings. This, in turn, could force retroactive tax changes at some future date. A difference in accounting methods could also vary results among the separate aircraft companies.

The aircraft group probably contends with more adjustments of this type than most any other industry. The very nature of aircraft manufacture gives rise to this peculiarity.

The aircraft industry is essentially a contracting business and as such does not lend itself to an exact accounting by precise yearly periods.

▶**Tentative Finality**—Major procurement contracts may run upwards of two years before completion. Accordingly, any interim accounting determination must be regarded as only tentative until all contract deliveries are made. In practice, however, once the annual reports of most aircraft companies are released, the published figures are accepted as final and filed away in the reference manuals.

Even assuming that contract deliveries are all completed, there is no irrevocable finality to the transaction. With the government the principal customer, the aircraft industry is subject to a series of contract price redeterminations and renegotiations.

These processes may run their course a year or more before management will know the exact profit or loss adjustments that may apply to completed business of prior years.

▶**Carry-Forward**—Consolidated Vultee provides an interesting case history as to the cushioning effect of the carry-forward provision of the tax laws. For the year ended Nov. 30, 1950 Convair reported a net income of $10,241,644. No federal taxes were paid for this period, however, due to tax credits accrued from losses of past periods.

The company further expects that a substantial portion of 1951 earnings will also be tax free. As to excess profits taxes, Convair does not feel that it will feel the impact to "any substantial degree, if at all," prior to fiscal year 1952.

Convair's 1950 earnings are also inflated by $514,555 representing the amount recovered in the settlement of prior year's taxes as carried on the balance sheet for federal tax claims. This excess provision was included in 1950 net income.

Further, if Convair had not revised its accounting procedure by including estimated profits on uncompleted cost-plus-fixed-fee contracts for which expenditures have been made, its net earnings would have been only $7,988,064 instead of $10,241,644.

Boeing Airplane Co. made a similar change in its accounting procedure which increased earnings. For the year ended Dec. 31, 1950, the company reported net income of $10,826,558. By including uncompleted sales to the extent costs and all applicable fees are considered reimbursable by the company, Boeing's 1950 sales were increased by $1,445,785 and its net earnings, after taxes, boosted by $691,230.

▶**Tax Returns**—Curtiss-Wright Corp. reveals a retroactive adjustment on taxes of another type. For 1944 to 1947, inclusive, the company now appears to have provided excess reserves for federal taxes of $13,400,000. This amount was previously taken out of earnings for those years. With the settlement of tax claims for that period, the $13,400,000 in provision for federal taxes has now been transferred to earned surplus. This simply means that 1944 to 1947 earnings were previously understated by that amount.

Very much the same condition prevails with United Aircraft Corp. For the year ended Dec. 31, 1950 the company reported net income, after taxes of $13,204,128. However, included in such income was the amount of $2,676,127 representing the refund and adjustments of taxes on prior years and covering 1944, 1945, and 1946. In other words, 1950 reported earnings are overstated by the amount of this tax adjustment.

▶**Different Treatment**—Bendix Aviation Corp. also made a substantial tax recovery for past periods, but did not include such gain in its 1950 fiscal year's earnings. For example, the company settled its income taxes for the war years, 1940 to 1946 inclusive. In this settlement, it received a net refund of $1,086,971.

As a result, it no longer needed a tax provision amounting to $3,760,154 which had been accumulated during the years involved. Consequently, a total of $4,847,125 was credited directly to earned surplus. While 1950's earnings were not inflated by this process, results as previously reported for the war years now appear to have been understated.

North American Aviation, Inc. has a series of tax adjustments which go back to 1942 and 1943. None of these, however, is incorporated in reported earnings for the year ended Sept. 30, 1950. In fact, none of the estimated credit of about $1 million has as yet been taken into earned surplus. The company is awaiting approval of the Bureau of Internal Revenue in Washington and of the Joint Congressional Committee before it is willing to count on this net refund.

McDonnell Aircraft Corp. reported net income of $2,815,219 for the fiscal year ended June 30, 1950. Included in this total, however, was the amount of $377,733 representing a proposed settlement by the company on a completed contract but subject to ratification by the Government. Further, the Bureau of Internal Revenue has notified McDonnell of a cumulative deficiency on taxes of about $150,000 covering the period June 30, 1942 to June 30, 1946. The company denies this liability and has petitioned for a refund of about $13,000 instead in the U. S. Tax Court.

There is not a single aircraft company which, at one time or another, can avoid tax adjustments covering past periods. This is inherent in the character of the industry and provides an important qualification to current earnings reports as released.

—Selig Altschul

Northwest Reports Substantial Increase

Northwest Airlines showed a substantial increase in revenue in 1950, but turned in a net loss for the year of $135,478 after tax and mail pay adjustments. For the preceding year, net profit amounted to $1,357,679.

Total operating revenues were $51,396,000, vs. 1949 adjusted total revenues of $40,925,000. Last year, operating expenses totaled $51,595,000, including depreciation and amortization charges of $5,873,000. In 1949, depreciation and amortization amounted to $3,956,000 in total expenses of $38,988,000.

A tax credit of $265,000, plus sundry income and deductions, brought Northwest's loss for 1950 to $493,961. Mail pay adjustments for previous years amounting to $358,483 reduced the net loss to $135,478.

Opportunities for ELECTRONICS ENGINEERS

The advance of electronic research and development, especially in the last five years, has been so rapid that a great demand for engineers and technicians has been created. This is especially true at the Martin Company . . . one of the country's leaders in airborne electronic research since before V-J Day . . . with such developments as control systems for guided missiles like the KDM-1 Plover target; the Viking high-altitude research rocket; fire control systems for turrets and much other advanced work still classified under military security.

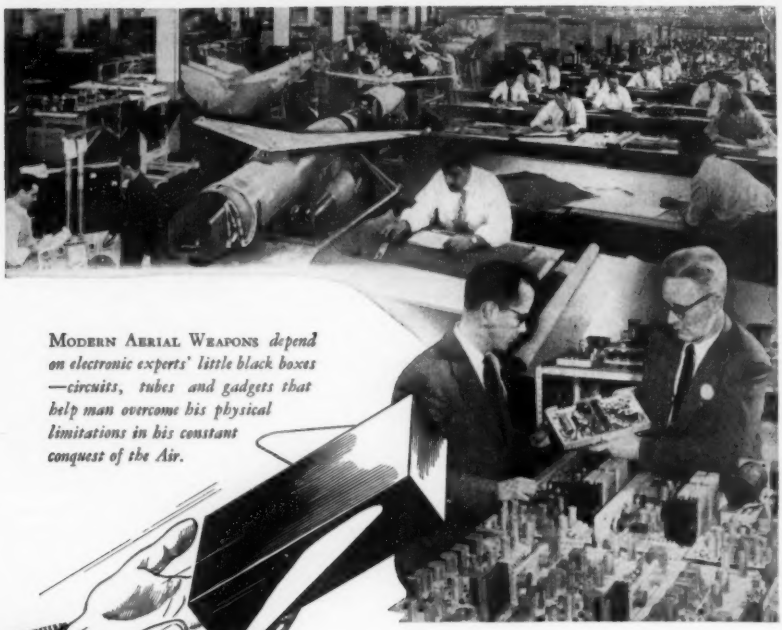
Martin needs engineers with experience in research and development of radar, television, pulse and display circuits . . . and, in the electro-mechanical field, experienced engineers in armament, servo-mechanisms, electrical work, rocket propulsion and special weapons or systems design.

The Martin Company would like to have a resume of the background of anyone having experience in electro-mechanics or electronics. Such information should be sent to the Employment Manager, The Glenn L. Martin Company, Baltimore 3, Maryland.

Martin Ads Tell Air Power Story

Reaching millions of informed, alert American magazine readers, Martin advertisements like this highlight air power's important role in our country's preparedness program.

Survey after survey has demonstrated that their story-style appearance attracts an extremely high readership and a worthy audience for the facts on this vital question.



MODERN AERIAL WEAPONS *depend on electronic experts' little black boxes —circuits, tubes and gadgets that help man overcome his physical limitations in his constant conquest of the Air.*

They're putting wings on little black boxes

Many of our new winged weapons are pilotless. But even in today's piloted aircraft, man can't see far enough, can't move fast enough, can't live unaided at the temperatures and pressures he must endure. He needs the assistance of mechanical and electronic senses, muscles and nerves. That's why today's aerial weapons engineering demands a teaming of specialists in skills unheard of a decade ago.

Here at Martin, we call it *systems engineering*. Airframe and power plant, electronic flight and navigational controls and military armament—all are represented on a Martin engineering team that is designing aircraft as integrated airborne systems.

A Navy Viking high-altitude research rocket, missiles and target drones soaring into the blue. An Air Force XB-51 jet-powered ground support bomber roaring down in a simulated strafing run. A Navy P5M-1 Marlin being readied for sub-hunting duty. A dependable Martin Airliner gaining precious time for vacationist and businessman. All these are products of Martin *systems engineering*—part of a new trend in aeronautical designing that is putting wings on little black boxes —to help man overcome his physical limitations—to help him guard the peace and enjoy it.

THE GLENN L. MARTIN CO.,
Baltimore 3, Maryland.

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AIRCRAFT
Builders of Dependable Aircraft Since 1909

Developers and Manufacturers of: Navy P5M-1 Marlin seaplanes • Navy P4M-1 Mercator patrol planes • Navy KDM-1 Plover target drones • Navy Viking high-altitude research rockets • Air Force XB-51 experimental ground support bombers • Martin airliners • Guided missiles • Electronic fire control & radar systems • Precision testing instruments • **Leaders in** Building Air Power to Guard the Peace, Air Transport to Serve It.

Domestic Trunkline Revenue and Expense

	TOTAL OPERATING REVENUE	TOTAL OPERATING EXPENSE PER REVENUE TON MILE	NET OPERATING PROFIT	NET PROFIT
1950*	$490,689,627	$0.47	$65,749,189	$36,012,140**
1949	459,782,544	.54	24,625,337	13,378,209
1948	413,352,887	.58	2,075,114	(4,996,306)
1947	352,490,368	.55	(20,900,101)	(20,242,229)
1946	311,893,041	.49	(5,228,439)	(5,626,554)
1945	214,606,665	.42	33,980,336	16,904,567

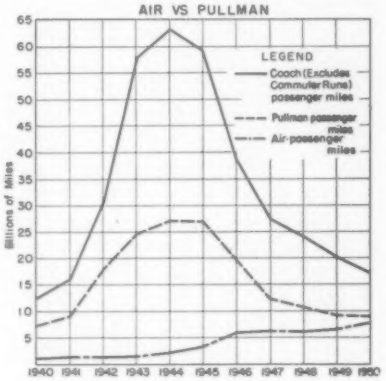
* Not including Northwest Airlines.
** 1950 net profit figure includes TWA and United Air Lines, who consolidate domestic and int'l. net profit and/or loss (Aviation Week, Apr. 9, p. 16).

Revenue Passenger Miles—Air vs. Train

(000 omitted)

	AIR*	PULLMAN‡	COACH‡
1940	1,157,900	7,287,787	12,485,316
1941	1,506,303	9,166,039	16,106,036
1942	1,501,279	17,852,577	30,910,292
1943	1,670,935	24,675,279	57,907,149
1944	2,211,905	26,943,593	63,287,551
1945	3,408,290	26,912,399	59,414,990
1946	6,068,315	19,801,007	39,039,427
1947	6,307,690	12,260,763	27,660,347
1948	6,227,932	11,014,551	24,314,887
1949	6,625,065	9,349,319	20,272,943
1950	7,871,405	**9,221,146	**17,370,127

‡ AAR—ICC Analysis of Passenger Traffic forms; coach figures exclude commuter runs.
* Excludes military charters.
** Pullman and coach Dec. 1949 thru Nov. 30, 1950.



Airline Business Shows Growing Strength

Low cost operations plus heavy traffic more than double 1949 profits and this year looks even better.

Domestic trunk airlines attained about $35 million net profit after taxes in 1950—compared with just $13,378,209 in 1949 and a total net loss of over $30 million in 1946-48. Heavy traffic combined with low-cost operations on tried-and-true equipment to usher in a new era last year—similar to the great year of 1945, when the airlines earned $16,904,567 by getting high load factors on their well-broken-in DC-3s.

And 1951 traffic so far is running considerably higher than the record 1950. January 1951 trunkline operating profit, excluding American Airlines, already totals $3,621,000. Airlines have generally lost money in January in the past.

The secret of the profit jump is in low ton-mile cost. Trunklines averaged 47 cents a ton mile total operating expense in 1950. That compares with 54 cents in 1949 and 58 cents in 1948. Ton-mile cost back in 1945 was only 42 cents, but that was before inflation set in.

▶**Domestic Revenue**—The 1950 total domestic operating revenue of trunklines was $490,689,627. Not counting Northwest, the trunk airline operating profit of $65,749,189 (before taxes and other adjustments) represented a net operating profit margin of only 5¼ percent and a 1945 operating profit margin of 16 percent.

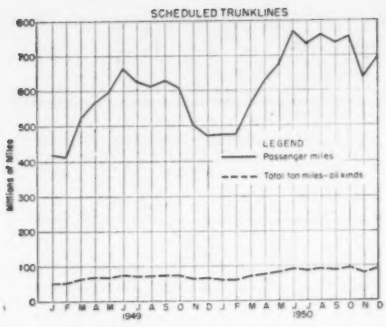
The figures thus compare favorably with other peak years.

Observers say the big jump in the 1950 profit margin—to almost that of prosperous 1945—is mainly due to two things: high load factor and reduced costs on aircraft and ground operations. The 1950 load factor of 63 percent is six percent higher than 1949. While the high load factor automatically reduces unit costs, there is an additional cost reduction in 1950 attributable: (1) to greater efficiency of management and equipment after the 1946-49 economy era; and (2) to better performance of the postwar DC-6, Constellation, and Convair-Liner after several years' break-in experience. Whether 1951-52 will see temporarily increased costs on the brand new Super-Constellation, DC-6B, Convair 340 and Martin 4-0-4 is a question. Fortunately, all of these are merely souped-up versions of their earlier models, so break-in cost should be less than it was in the 1946-49 period.

▶**Air Bites Iron**—Airlines cut deeply into rail travel in 1950. While first-class rail travel dropped fractionally from 1949 to 1950 (9,221,146,000 passenger miles) trunk airline passenger miles gained 12 percent to 7,871,405,000 passenger miles.

▶**Air Coach Hits Rail Coach**—Even more significant than the trend toward air travel replacing rail pullman travel is the bite that air coach is taking out of rail coach.

While trunkline travel increased 12 percent, rail pullman stood still and rail dropped 14 percent (excludes short-haul


SCHEDULED TRUNKLINES
LEGEND
Passenger miles
Total ton miles—all kinds
millions of miles
J F M A M J J A S O N D J F M A M J J A S O N D
1949
1950

Trunkline Mileage

PASSENGER MILES

	1949	1950
Jan. ..	419,789,000	474,240,000
Feb. ..	421,534,000	474,290,000
Mar. ..	521,333,000	558,078,000
Apr. ..	564,283,000	625,979,000
May ..	594,496,000	672,773,000
June ..	662,161,000	766,830,000
July ..	624,961,000	730,357,000
Aug. ..	611,517,000	756,963,000
Sept. ..	628,041,000	732,712,000
Oct. ..	606,476,000	751,582,000
Nov. ..	500,112,000	634,279,000
Dec. ..	470,902,000	693,322,000
TOT. ..	6,625,065,000	7,871,405,000

TON MILES—ALL KINDS

Jan. ..	52,618,712	59,974,953
Feb. ..	52,859,995	59,368,925
Mar. ..	65,502,992	70,285,388
Apr. ..	70,173,054	75,910,388
May ..	69,737,615	81,289,636
June ..	76,275,309	89,996,870
July ..	71,421,806	86,397,667
Aug. ..	72,358,938	90,151,973
Sept. ..	75,173,400	88,319,426
Oct. ..	74,015,726	92,084,647
Nov. ..	63,749,842	79,835,799
Dec. ..	64,822,308	89,511,343
TOT ..	808,709,697	963,127,515

commuter service). How much of this was due to introduction of air travel to the mass market by means of low air coach rates is a question, as up-to-date air-coach statistics are not available. But the airlines using air coach know they are making money on the coach service. And that is before counting on any "return-engagement" profit that accrues from selling a new market on air travel.

In 1946 all domestic air passenger miles were only 15½ percent of all rail coach travel, excluding commuting. In 1950 air travel was 45 percent as great as rail coach and 30 percent as great as all rail travel—pullman and coach—other than commuting.

As of last week, all certificated airlines except Northwest and Pan American had reported their financial statistics for the year 1950 at the CAB on the so-called Form 41. The carriers file their monthly traffic statistics at CAB about the 30th day after each month.

Starting this January, both financial and traffic reporting forms are revised to give more data.

Progress Seen on Boosting Airlift

Rentzel cites areas of agreement among policy-makers on far-ranging plans to increase airlines' potential.

Delos W. Rentzel, as chairman of the NSRB air transport mobilization survey, reports much progress in getting top-level agreement on the military-civil plan to boost air transport as an airlift mobilization reserve.

Most important feature potentially is the military requirement for air freight development and operations subsidy. That is still just a requirement with no solution yet. But some Air Force officers reportedly are getting more eager for the government and the civil air transport industry to devise some way to foster air freight development.

(Rentzel is moving up from the CAB chairmanship to be Undersecretary of Commerce for Transportation, and he is now Defense Mobilizer C. E. Wilson's mobilization coordinator of land, sea and air transport. He is also chairman of both the Civil-Military Air Coordinating Committee and the NSRB Air Transport Mobilization Survey.)

The NSRB plan to stimulate long term air transport build up is going as follows:

But Rentzel says the preliminary plan will be ready in six months. Biggest problem, though, is lack of an ideal freight plane. What's needed is something like a plane designed for transit van loading of modular-size portable packages.

• **Air freight prototype** development plans for airlines are still uncertain this year (AVIATION WEEK, Apr. 2).

• **More military use of airline services** is still a growing, conscious policy of the military traffic service.

• **Self sufficient route patterns** for the domestic trunklines are CAB's pet project right now. CAB aims to make all the trunks self sufficient. The board is sponsoring more compulsory interchanges between airlines (AVIATION WEEK Mar. 26) and also is helping the trunklines get rid of stops that lose money. The Board favors mergers too, but cannot compel them.

• **All-weather slow down** inherent in the two-thirds slash of the Air Navigation Development Board program is a blow to future airline business growth, many observers agree. But Rentzel plays this down, saying it affects only long-range projects. However, the item-by-item slash shown in AVIATION WEEK Apr. 2 shows that further development contract coordination toward a common system of all-weather operation is virtually killed for the duration of the ANDB demise.

• **Fostering of international** air coach travel on U.S. planes is expected to start in the summer of 1952. It will not be a small pilot test operation, Rentzel predicts. He says international air coach over the Atlantic will start strong and grow stronger. Foreign resistance to air coach will not kill the program, Rentzel predicts.

• **First-class mail by air** over long hauls is still in the planning stage at the Post Office Department. Plans progress is rapid but right now the airlines lack the planes. Extra planes needed are estimated at anywhere from 40 to over a hundred freighters, depending on how fully they are utilized. On a straight tonnage basis assuming full utilization of DC-4s loaded with nothing but mail, only about 40 planes might be needed. Former Postmaster Robert E. Hannegan told Congress in 1946 that some 500-700 planes might be needed, but that figure is far too high, Air Transport Assn. says.

► **Subsidy**—The avowed CAB policy now is to put the trunk airlines on no-subsidy mail pay as fast as they reach that capability. The big four—American, Eastern, TWA, and United—have lately been negotiating permanent non-subsidy mail rates with about 57-cents-a-ton-mile pay for mail service in the recent past, and something around 45-cents-a-ton-mile future pay. Provision is left, however, for recapture by either airline or post office in changed future conditions.

One by one the rest of the trunks will be pushed toward equal self-sufficiency.

This CAB policy of reducing mail pay at first seems inconsistent with repeated military and civil policy statements such as the President's Air Policy Commission report in 1947 (Finletter report). Air policy of defense calls for build-up of airlines now more than ever—as the first line of airlift reserve in war.

But the answer, says Rentzel, is this: true, overall mail pay subsidy will decline. (Reason for this, not mentioned by Rentzel, is that Congress is reluctant to continue airline subsidy when the line can stand without it.) But, says Rentzel, other things will compensate for declining mail pay per ton mile: these are the indirect aids to air business listed above.

Defense Department and other government agencies will see the airlines get the business to build them to the required airlift potential, Rentzel says. That may give defense more control and power to build the airlines.

Group Studies Specs For Planes of Future

New design specifications for three planes of tomorrow—a local service, a cargo, and a jet transport—have come out of a three-day session of the prototype Aircraft Advisory Board's technical sub-committee.

The board has Congress' promise of $12 million to use on prototype testing. But right now it has no prototype to test, so it is working on specs for future designs.

Here are the new specs for as-yet-unbuilt planes:

• **Local Service** – The committee amended preliminary requirements (AVIATION WEEK, Nov. 29):

30-mile-an-hour cross wind allowance added to the 3300-ft. single-runway field length requirement.

Cargo floor strength 150 lb. per sq. ft., with provision for increasing to 200 lb.

Direct operating cost should be lower than the old-timer DC-3.

Depreciation cost of the proposed plane must be measured at a seven-year life. In figuring operating costs depreciation on the DC-3 should be for a 4-year life.

• **Jet Transport Ideas**—The American jet transport of the future must be able to carry airborne radar, the committee agrees. And here are some new requirements for the plane. These show some changes from the specs drawn by a similar committee two years ago:

	1951 Specs For Jet Transport	1949 Specs For Jet Transport
Payload	20,000 lb.	10,000 lb.
Range	2000 miles plus 800 reserve	2400 miles plus 800 reserve
Passengers	64–68, seated four abreast	40
Speed	500 MPH., block to block	same
Field Length	5600 ft.	6000 ft.
Operating Cost, Direct, Per Ton Mile	9–13 cents. No more than current DC-6	9–13 cents
Purchase Cost	$12,500,000 each in quantity of two	$16,500,000 each in quantity of two

• **Air Freighter**—The committee spent half a day going over cargo loading and carrying. Most experts agree today that the commercial cargo plane of the future should use some system of prepackaged pack or pod. This would cut time and labor in loading and unloading—which is the chief way to cut cost per ton carried. Type packages discussed are:

Transit van, a package-sized van for plane, truck and train handling. John Alison, Transit Van Corp. president, described his designs.

Speedpak, a streamlined pod that fits under conventional planes. Robert E. Reedy of Lockheed Aircraft Corp. and Charles Froesch, Eastern Air Lines, discussed this pod used by Eastern.

Canopy pod, a crane-loaded pack that fills in the upper section of the fuselage. Harlan D. Fowler, consultant, went over this one. Fairchild Aircraft representatives described the advantages of pod attached to the plane's underside.

▶ **Jet Operations Testing**—The prototype testing board plans to test an Air Force bomber—the B-45—on simulated airline operations. Despite obvious differences of bomber and commercial transport, the board chooses the bomber over the British or Canadian jet airline transports. This meeting did not go over the jet test plan extensively, but (non-sked) Air Coach Transport Assn. president Amos Heacock resigned his place on the committee, saying the jet testing plan was unrealistic; he said he would prefer to be on the outside, free to criticize the prototype plans.

The committee decided to drop the Chase C-122 assault transport from its testing program. The C-122 may not be available, and may not prove much, the committee said. Main thing it planned to learn here was the advantage of handling cargo with a low-slung plane, cargo door low to the ground.

▶ **Engines**—The committee decided not to work yet on requirements for turboprops, in view of their rapid development on new military planes.

Local Boards to Rule On Pilot Deferment

The question of which commercial pilots are eligible for deferment from military service still stands, despite the Labor Dept. listing of several types of twin-engined piloting as critical occupations.

Airline, test operation, and cargo- and personnel-carrying pilots are generally doing "critical occupation work," the Labor list says. But, says Dewey Coates, executive secretary of the Labor-Commerce Committee on Essential Activities and Critical Occupations, each pilot's status depends on what he transports and how the particular local military delay board views his situation.

An example: A Texas oil firm has two planes—a twin-engined Beech D-18S and a Bonanza—to ferry personnel and bits of equipment about Texas. Oil is an essential industry. And pilots on cargo- and personnel-carrying twin-engined planes are on the critical occupations list.

Those are the legal facts making the firm's pilot especially eligible for deferment consideration. The rest is up to the local military delay board after the employer, in accordance with Air Force Regulation 3583, requests the pilot's deferment.

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Interchanges

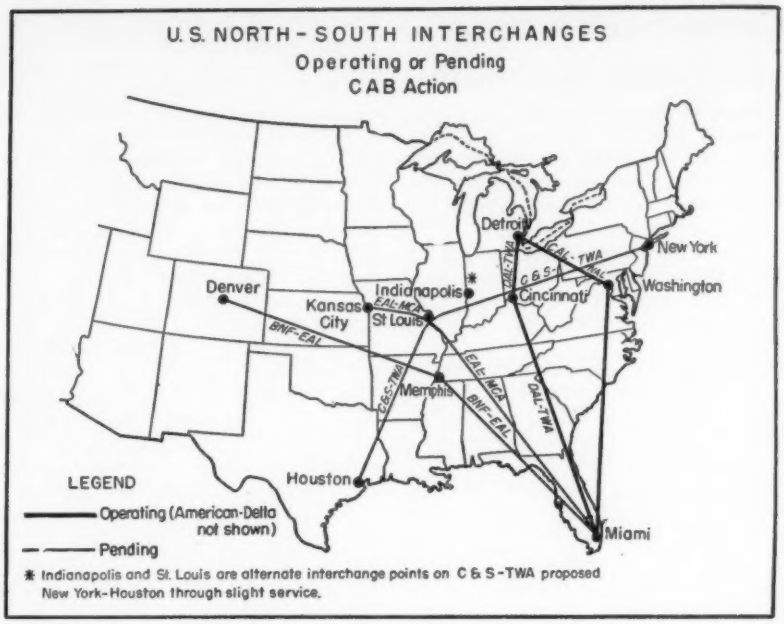
By approving equipment deals, CAB plans wide route pattern changes.

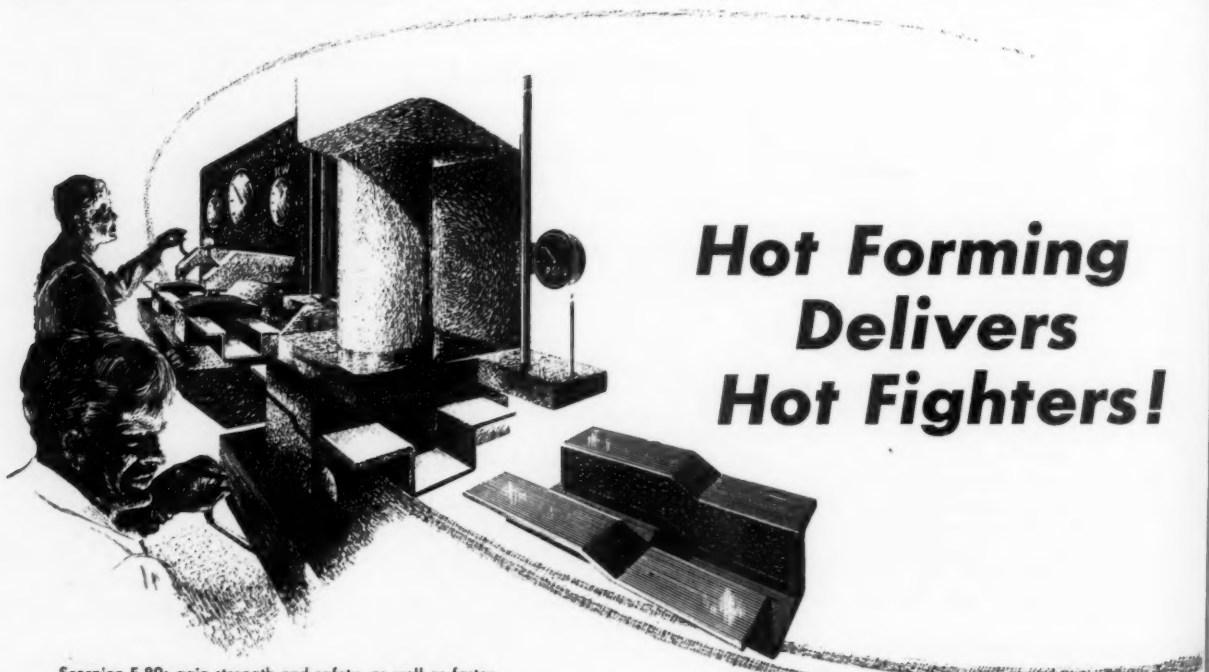
CAB this month will markedly change the airline traffic patterns of both North and South America. The method used will be airline equipment interchange. The changes will affect southern transcontinental service and North-to-South America service.

The Board this month will finally approve—in time for summer scheduling—the five airline interchange agreements going southern through-plane service to the West. Apr. 30 is the deadline, say CAB sources.

CAB has already written the first draft of its opinion, "tentatively" approving the National-Panagra interchange providing through plane service between New York and South American points, competitive with Pan American. The Board is expected to issue this "opinion" within the month, but the interchange operation would not start until late summer, airline sources estimate.

The CAB opinion will not allow National and Panagra to start operating their interchange right away. The Board will allow time for another hearing on it. This procedure, and the re-writing of the go-ahead order for temporary Panagra-National interchange, will take CAB at least three months after its "tentative" opinion is issued. Then the airlines will take a month to get going on their inter-American schedules. So, assuming the tentative opinion comes out by Apr. 30, the temporary approval may be expected by August and the actual operation by September. The Board wants the Panagra-National set-





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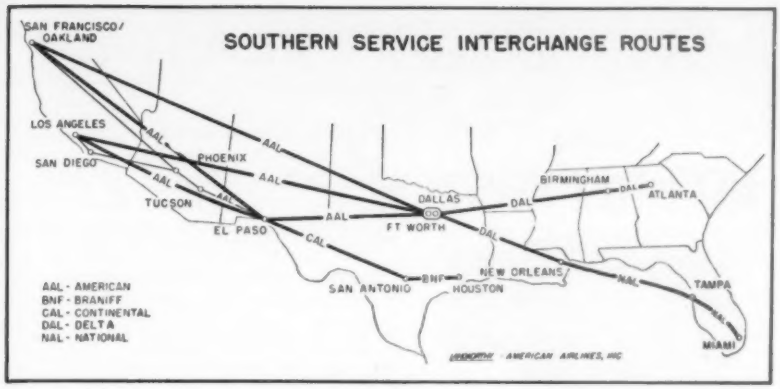

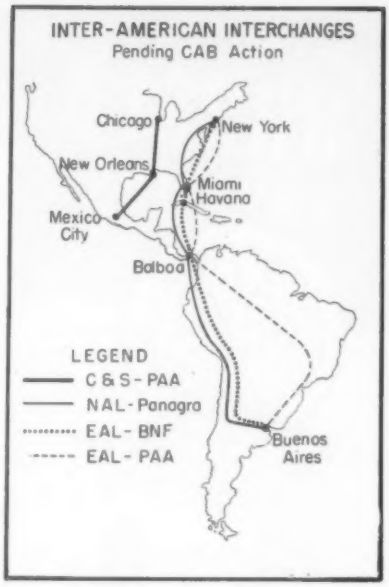

up temporary—just to get something going while deciding on a permanent pattern.

▶ **Inter-American Rivals**—Other New York-S.A. interchange proposals the Board will consider for permanent approval are: Eastern Air Lines-Pan American; and Eastern Air Lines-Braniff Airways. Board observers say CAB will finally approve only two of the three New York-South American interchanges.

A separate interchange proposal that is not hooked up with those three is the Chicago & Southern-Pan American interchange proposal—Chicago-Mexico City.

▶ **U. S. Interchanges**—CAB wants no more big new routes in the U. S.; they raise expenses and shake up the established airline pattern. Solution: interchange. The three traffic points areas of the U. S. that grew fastest after the basic U. S. route pattern was laid out are: Florida, Texas, California. So CAB, instead of granting new routes to build service in the new areas is by setting up interchanges.

• **Miami.** Already operating are two Detroit-Miami interchange routes. Now awaiting CAB decision are two more north-to-Miami interchanges—one from Denver and one from Kansas City; CAB itself proposed both.

• **Houston.** Two interchanges to Houston are pending: New York-Houston via TWA and C&S interchange at Indianapolis or St. Louis; Miami-Houston via National and Eastern interchange at New Orleans.

• **Dallas.** CAB would like to see more New York-Dallas service. American gets about all the rich New York-Dallas trade now.

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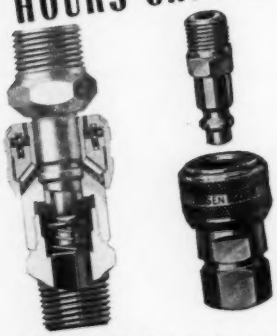

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SHORTLINES

► **All American Airways**—CAB Examiner Richard A. Walsh recommends that CAB connect AAA's stub-end turnarounds at Newark and Atlantic City by a coastline route extension joining them via Asbury Park. This would do two other things for AAA beside cutting costs by eliminating AAA's two biggest turn-around scheduling problems, he says. It would generate Washington and New York traffic along the Delaware and Jersey coast stops, and open up the Asbury Park-Ft. Monmouth market for AAA.

► **Capital Airlines**—Capital earned $31,267 operating profit in February; net profit after taxes ran $7120, compared with last year's $81,517 loss. This is Capital's first February profit in 24 years. Operating revenue of $2,497,054 is $625,022 more than last year. . . . Two-months' 1951 figures are: Revenues $5,154,428, net profit $15,462.

► **Canadian Pacific Air Lines**—CPA's Rolls-Royce-powered DC-4s have flown 750,000 mi. on the Tokyo airlift without a major mechanical failure. Average turn-around time at Tokyo is two hr.

► **Chicago & Southern Air Lines**—C&S has bought five of the six Constellations on order without touching its $2,000,000 loan commitment. All its DC-4s are now sold. Sixth Connie is due off the Lockheed line in June.

► **Colonial Airlines**—This week Colonial completes its twenty-first year of non-injury, non-fatality flight operation. . . . Company's $85 roundtrip to Bermuda has helped boost February Bermuda traffic to four times last year's.

► **Flying Tiger Line**—Tiger's shifting of freight and maintenance facilities to new space at Newark Airport will multiply its working area more than seven times. Warehouse space is 21,000 sq. ft., ramp and parking area is 52,000 sq. ft. Maintenance was all concentrated at Burbank previously. . . . The line now employs over 1300 men; payroll exceeds $500,000 a month.

► **Italian Airlines**—LAI next month increases New York-Rome service to two roundtrips a week.

► **Pacific Northern Airlines**—PNA reports Alaska passenger traffic up 57 percent, air cargo up 24 percent and mail up 47 percent for the first two months of 1951.

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1600	11210	Cover
100	11762	Guide
7	26456-2	Bearing
1157	35787-5	Bushing
2174	35787-10	Bushing
39	35807-8	Stud
814	35814	Blower Assy.
3967	35817	Spring
280	35855	Cap
2446	35924	Washers
4200	35932	Gasket
6	37751	Cover
15	37993	Housing Stud
28	38314	Rod Assy. Comp
20	45213	Cover
182	46400E	Liner
30	48346	Cylinder
1	48347	Cylinder
1475	48360	Bearing
53	48362	Shaft
175	48363	Shaft
3	48388	Sump
100	48389	Fitting
209	48390	Retainer
56	48392	Sump
533	48447	Bushing
107	48457	Adapter
76	48458	Bushing
390	48461	Gear
149	48468	Bearing
90	48468B	Bearing
389	48469	Bearing
470	48470	Bearing
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395	54847	Clamp
71	56721	Cover
71	57006	Cover
10	68375	Gear
16	68837	Clamp
78	76236	Gear
5	77453	Housing (Reduction)
565	81397	Tube
10736	84185	Cover Assy.
261	84235	Pipe
155	84281	Spacers
1351	84282	Adapter
12	84284	Adapter
1178	84289	Bearing
113	84487	Housing
87	84567-8	Stud
77	84591C	Nose Housing
178	84602	Bracket
251	84687	Pinnon
30	84702	Shroud
397	84752	Bearing

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20	TA12B	Transmitter
150	DA-1F	Dynamotor
162	3611-B	Amplifier
35	MR-9B	Control Box
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700	TFD 8600	Thompson fuel booster pump
125	D-7818	Adel anti-icer pumps
170	2P-771-A	Pesco fuel pump AN4102-1
250	AN4014	Erie Meter Systems D-3 hand wobble pump
300	1H260k and KA	Pesco Hydraulic hand pumps
478	D9530	Adel selector valve
233	D9530-2	Adel selector valve
428	D9560-2	Adel selector valve
744	D10044	Adel selector valve
2200	AN 4078-1	37D6210 Solenoid United Aircraft etc.
2000	AN 3096-4	Grimes Light assembly
800	AN 3096-5	Grimes Light assembly
380	AN 3096-6	Grimes Light assembly
75	EE 709-M2	Air associates Motor
115	P4CA2A	Parker Primers
80	AN 3213-1	Scintilla Ignition switch
568	A-9 (94-32226)	Ignition Switch
687	RS-2	Mallory Selector boxes
490	AN 6203-1	Vickers Hydraulic Accumulator
88	572-3A	Eclipse Distributor Valve
90	JH-950R	Jack & Heintz Starter Motor for JH5 starters
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AVIATION CALENDAR

Apr. 16-18—Society of Automotive Engineers aeronautic and aircraft engine display, Hotel Statler, New York.

Apr. 19-20—Three-day welding clinic, Baltimore warehouse of Whitehead Metal Products Co., Inc., Md.

Apr. 19-21—Airport Operators Council annual meeting, Hotel Peabody, Memphis, Tenn.

Apr. 23-24—Semi-annual meeting of the Air Industries & Transport Assn. of Canada, Harrison Hot Springs Hotel, Harrison, British Columbia.

Apr. 23-26—Meeting of American Assn. of Airport Executives, Radisson Hotel, Minneapolis.

Apr. 24—Fourth session on communications by International Civil Aviation Organization, Montreal, P. Q.

Apr. 24-26—ATA annual engineering and maintenance conference, Hotel Drake, Chicago.

Apr. 26-29—1951 annual forum of the American Helicopter Society, including flight demonstrations of representative service copters, Washington, D. C. Chairman is Bartram Kelley, Bell Aircraft Corp., P. O. Box 1, Buffalo 5, N. Y.

May 4-6—Fourth annual national intercollegiate air meet, Max Westheimer Field, Norman, Okla.

May 7-11—National Fire Protection Assn.'s annual meeting of committee on aviation and airport fire protection, Hotel Statler, Detroit, Mich.

May 12-13—Airlines Medical Directors Assn., eighth annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 16-18—1951 spring meeting of Society for Experimental Stress Analysis at National Bureau of Standards and Wardman Park Hotel, Washington, D. C. Send inquiries to Dr. Edward Wenk, Jr., David Taylor Model Basin, Washington 7, D. C.

May 17-19—Annual convention of the Women's Aeronautical Assn., of the U. S., Little Rock, Ark.

May 21-24—Tenth annual conference of the Society of Aeronautical Weight Engineers, Hotel Jefferson, St. Louis, Mo.

May 22—Aircraft Technical Committee national meeting, Aircraft Industries Assn., Statler Hotel, Washington, D. C.

May 27-30—Third annual Wright memorial glider meet, South Dayton Airport, Dayton, Ohio.

June 13-16—Aviation Writers Assn., convention, Hotel Commodore, N. Y.

June 15-July 1—International aviation display, Grand Palais and Le Bourget Airport, Paris.

June 18-July 6—Three-week Air Age Institute course, Parks College of Aeronautical Technology of St. Louis University, East St. Louis, Ill.

June 27-29—Mid-year meeting of officers and directors of Aviation Distributors and Manufacturers Assn., The Homestead, Hot Springs, Va.

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EDITORIAL

Refreshing News From Alabama

A refreshing story from our Southeast area correspondent deserves more attention than the average dispatch.

It seems Alabama legislators were aghast the other day when Aeronautics Director Asa Rountree, Jr., asked the interim committee on finance and taxation for a reduction in his department's administrative budget from $63,000 a year to $43,000. The Aeronautics Department operates entirely out of revenue from the tax on aviation gasoline, which is earmarked for that purpose.

Our correspondent, E. Dalton White, reports that the legislators got another shock when Mr. Rountree added that he could get along without four or five state-owned automobiles assigned the department.

Director Rountree has also cut his staff by five employes since last July.

Alabama should consider herself fortunate to have a public servant like Mr. Rountree. He stands out in brilliant contrast to the typical bureaucrat who has a perpetual case of the "gimmies." Let him stand as an example to government officials everywhere.

If there are, by chance, other government aviation personages who have cut their agency personnel and expenditures voluntarily, we hope someone will write us about them. We shall be pleased to accord them a proper tribute too.

Misinformation on Non-skeds

Comments on the latest misinformation about non-scheduled carriers:

(1) The claim that since U. S. flag domestic and international non-skeds flew over 700 million revenue passenger miles last year at around three cents per passenger mile, CAB's elimination or drastic cutting of non-skeds service "could boost certificated airlines' 1951 passenger revenues by $10 million or more." There is no substantial evidence whatever to support this statement.

Low air fares create more passengers. Some are drawn from surface transportation—cars, buses, trains, which help aviation.

A first-rider, never on a scheduled or nonscheduled plane, is a new and continuing customer for air transportation. Others go on trips they would not make at all on standard fares; the combination appeal of time and money saving is enormous. Some non-sked passengers may be diverted from the scheduled airlines. But we think the number is small—especially in contrast with the first riders the non-skeds develop. The scheduled airlines had the best business year in their history in 1950, despite the non-skeds.

(2) "The non-skeds are insignificant, business-wise." Untrue. Their 700 million revenue passenger miles computed at roughly three cents a mile adds up to some $21 million worth of business that the non-skeds carved out for themselves—no small bit of new business for aviation.

Just how much traffic is 700 million passenger miles relatively? In December, 1950, the entire domestic scheduled trunkline system of 18 airlines flew about 698.5 million revenue passenger miles. Northwest Airlines in 1950 flew about 513 million revenue passenger miles. It was the fifth largest domestic scheduled carrier from a revenue passenger mile standpoint.

(3) "The non-skeds' safety record is horrendous." In 1948 and 1949 there were serious crashes. But in 1950 the record improved tremendously. The combined U. S. flag domestic and international scheduled airlines achieved a rate of 1.4 passenger fatalities per 100-million passenger miles. The irregular air carriers achieved a rate of 4.1.

Scheduled carriers, domestic and international, had four fatal accidents in 1950 resulting in 144 passenger deaths. The non-sked carriers, domestic and international, had one fatal accident resulting in 28 passenger deaths. The non-skeds point out that this one crash was on a contract flight not open to the public.

For Safer Air Force Planes

The Air Force's Director of Safety, Maj. Gen. V. E. Bertrandias, has made an impressive plea that aircraft manufacturers "swap" information about design and equipment difficulties, and report them to the Air Force.

He told a New York meeting of the Institute of the Aeronautical Sciences that although he was not asking competitors to divulge trade secrets, he saw no reason why the manufacturers could not exchange facts which would enable all to benefit from the "mistakes" of each producer—mistakes which he said may have been discovered at the cost of human lives as well as dollars.

Gen. Bertrandias said most manufacturers have already agreed to the idea and are already in touch with the Directorate of Air Force Safety, Norton AFB, San Bernardino, Calif. This project is part of a safety engineering program, whose importance is highlighted by the general's announcement that more planes were lost by the Air Force in World War II from non-combat causes than were shot down by the enemy.

Cheers for Gen. Bertrandias! His program for wider dissemination of such data is commendable. We have no doubt about the industry cooperating fully with the Air Force on supplying information of its own discoveries and experience. But we do have the most serious doubts that the Air Force will swap back.

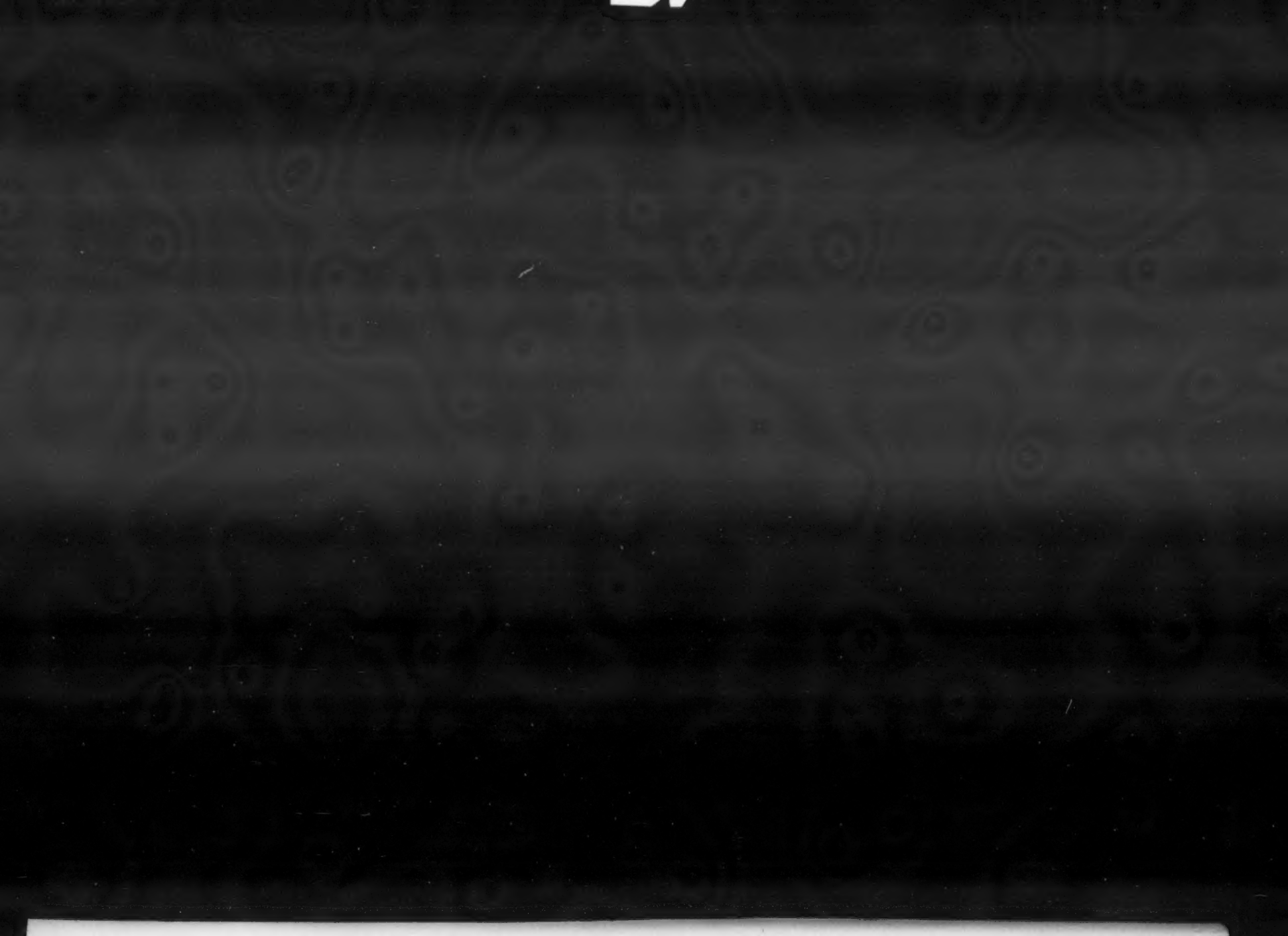
For there is much more to the everlasting search for safety than disseminating information to the services about manufacturers' "mistakes." Sheer lack of experience in new and unprecedented problems of design can be as important a source of accidents as "mistakes."

Operations of new planes by the services bring out lessons that cannot be forecast on the drawing boards. "Swapping" information about design and equipment difficulties is a two-way street and the Air Force has an obligation to pass along to the manufacturers what it learns in flying their airplanes.

Instead, the Air Force has always drawn a curtain of secrecy across all of itis accident investigations, and as far as the manufacturers are concerned has done little more than file the reports away in itis own locked files.

Time after time, conscientious officials and engineers in the aircraft companies have pleaded with AVIATION WEEK to print more information which would reveal clues to causes of military aircraft accidents, especially those occurring to new types. These industry people have told us repeatedly that little if any information reaches them unless or until a whole series of accidents pointing suspiciously to the same cause has aroused top brass to special emergency action.

Also time after time the AVIATION WEEK's efforts to get information from the Pentagon on results of accident investigations have met with failure. In fact, not one such effort has ever succeeded. The reason given the press? Security! Security for whom? Not for pilots and crewmen flying in aircraft that previous accidents have shown should be improved.

We shall watch Gen. Bertrandias' program for "safety engineering" with keen interest to see if he can keep vital safety information flowing out of the Air Force as well as into it.

—Robert H. Wood